

Bind

Sci 332

VOL. XV

NO. 1

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

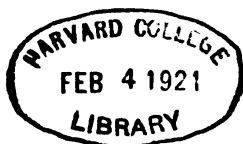
ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
CAPTAIN J. S. TAYLOR, MEDICAL CORPS, U. S. NAVY
IN CHARGE

MARE ISLAND HOSPITAL NUMBER

JANUARY, 1921
(QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1921



NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

NOTE.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume VII, No. 2, April, 1913.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 3, July, 1918.

SUBSCRIPTION PRICE OF THE BULLETIN.

Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C.

Yearly subscription, beginning January 1, \$1; for foreign subscription add 25 cents for postage.

Single numbers, domestic, 25 cents; foreign, 31 cents, which includes foreign postage.

Exchange of publications will be extended to medical and scientific organizations, societies, laboratories, and journals. Communications on this subject should be addressed to the Surgeon General, United States Navy, Washington, D. C.

TABLE OF CONTENTS.

	Page.
PORTRAIT OF SURGEON GENERAL E. R. STITT, U. S. NAVY	Frontispiece
PREFACE	vii
NOTICE TO SERVICE CONTRIBUTORS	viii
THE NAVAL HOSPITAL, MARE ISLAND, CALIF.:	
HISTORY OF THE HOSPITAL.	
By Captain A. Farenholt, Medical Corps, U. S. N.	1
OPERATING ROOM TECHNIQUE.	
By Lieutenant Commander Lucius W. Johnson, Medical Corps, and Bessie C. Graham, Nurse Corps, U. S. N.	10
THE UROLOGICAL SERVICE.	
By Lieutenant Commander A. B. Hepler, Medical Corps, U. S. N.	16
THE ROENTGENOLOGICAL SERVICE.	
By Lieutenant H. R. Coleman, Medical Corps, U. S. N.	30
THE LABORATORY.	
By Lieutenant G. A. Gray, Medical Corps, U. S. N.	34
FEATURES OF ORGANIZATION.	
By Commander E. C. White, Medical Corps, U. S. N.	40
GENERAL FILE AND RECORD SYSTEM.	
By Lieutenant D. C. Allen, Medical Corps, U. S. N.	47
SUGGESTED CLINICAL CHART.	
By Lieutenant Commander M. C. Baker, Medical Corps, U. S. N.	49
THE THEATER.	
By Chief Pharmacist T. C. Hart, Medical Corps, U. S. N.	50
STUDY OF ONE HUNDRED NAVY DESERTIONS.	
By Lieutenant A. H. Ehrenclou, Medical Corps, U. S. N., and Lieutenant W. H. Wilson, Chaplain Corps, U. S. N. R. F.	53
SURGICAL FAILURES.	
By Lieutenant Commander Lucius W. Johnson, Medical Corps, U. S. N.	69
CIRCUMCISION.	
By Lieutenant Commander Lucius W. Johnson, Medical Corps, U. S. N.	77
A GLUE CAST FOR FRACTURES OF LONG BONES.	
By Lieutenant H. R. Coleman, Medical Corps, U. S. N.	79
TUBERCULIN IN THE EARLY DIAGNOSIS OF TUBERCULOSIS.	
By Lieutenant G. A. Gray, Medical Corps, U. S. N.	81
DIPHTHERIA AT MARE ISLAND, CALIF., IN 1920.	
By Lieutenant G. A. Gray, Medical Corps, U. S. N.	84
AGGLUTINATION OF HUMAN ERYTHROCYTES BY SERA.	
By Lieutenant G. A. Gray, Medical Corps, U. S. N., and Phar- macist's Mate E. C. Upp, U. S. N.	86
A METHOD OF RINGING THE HANGING DROP, ETC.	
By Hospital Apprentice First Class D. G. Willard, U. S. N.	92
PREPARATION OF COLLOIDAL GOLD SOLUTION.	
By Marie Karlen, Reserve Nurse Corps, and Pharmacist's Mate First Class A. E. Bourke, U. S. N.	94
REPORT OF SEVENTY-FIVE REFRACTION CASES.	
By Lieutenant W. D. Horner, Medical Corps, U. S. N.	95
EMPYEMA CASES.	
By Lieutenant E. R. Guinan, Medical Corps, U. S. N.	99

THE NAVAL HOSPITAL, MARE ISLAND, CALIF.—Continued.

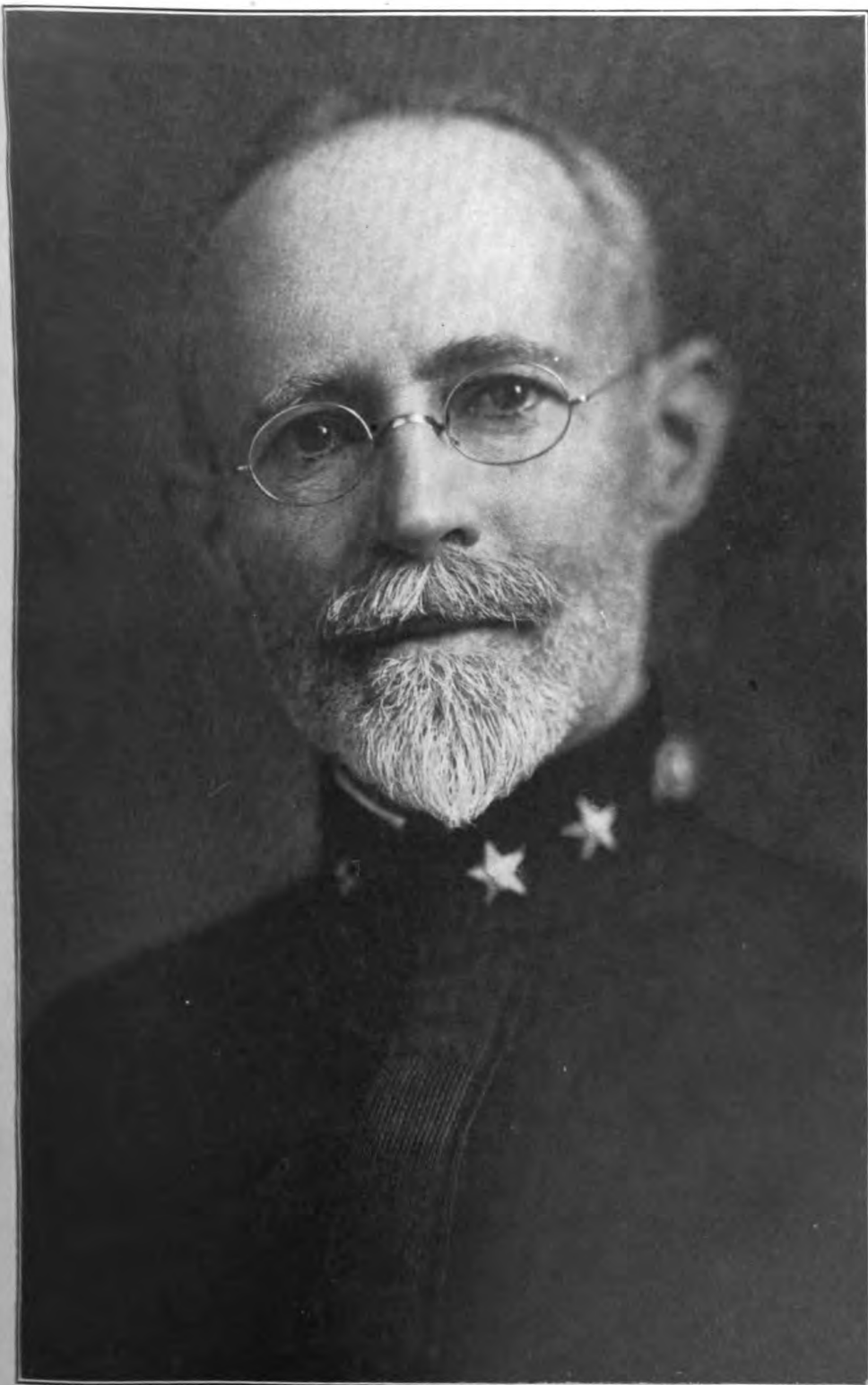
ACUTE MASTOIDITIS.	Page.
By Lieutenant C. N. Meador, Medical Corps, U. S. N.....	106
DENTAL FOCI IN THE ETIOLOGY OF SYSTEMIC DISEASE.	
By Lieutenant A. H. Ehrenclo, Medical Corps, and Lieutenant B. F. Loveall, Dental Corps, U. S. N.....	109
TRANSFUSION IN MEDICAL CASES.	
By Lieutenant D. H. Murray, Medical Corps, U. S. N.....	117
A DENTAL BRANCH OF THE HOSPITAL CORPS.	
By Lieutenant B. F. Loveall, Dental Corps, U. S. N.....	118
A CASE OF TUBERCULOUS PERICARDITIS.	
By Lieutenant A. H. Ehrenclo, Medical Corps, U. S. N.....	120
A CASE OF ACUTE ANILINE POISONING.	
By Lieutenant A. H. Ehrenclo, Medical Corps, U. S. N.....	123
A CASE OF TUBERCULOUS MENINGITIS.	
By Lieutenant J. J. Sale, Medical Corps, U. S. N.....	126
A CASE OF NEUROPARALYTIC KERATITIS.	
By Lieutenant C. N. Meador, Medical Corps, U. S. N.....	127
VERNAL CONJUNCTIVITIS TREATED WITH RADIUM.	
By Lieutenant W. D. Horner, Medical Corps, U. S. N.....	128
A CASE OF ACUTE MYELITIS.	
By Lieutenant L. E. Smith, Medical Corps, U. S. N.....	130
A CASE OF OSTEOMA OF THE TIBIA.	
By Lieutenant F. G. Linde, Medical Corps, U. S. N.....	131
A DISLOCATED SEMILUNAR CARTILAGE.	
By Lieutenant F. G. Linde, Medical Corps, U. S. N.....	132
A CASE OF COMPOUND FRACTURE OF TIBIA AND FIBULA.	
By Lieutenant F. G. Linde, Medical Corps, U. S. N.....	132
A DEATH FROM NITRIC ACID POISONING.	
By Lieutenant G. A. Gray, Medical Corps, U. S. N.....	133
NECROSIS OF THE MANDIBLE; TWO CASES.	
By Lieutenant B. F. Loveall, Dental Corps, U. S. N.....	134
HISTORICAL.	
ALEXIS SOYER.	
By Captain J. S. Taylor, Medical Corps, U. S. N.....	139
EDITORIAL.	
MORALE.....	175
SPECIAL ARTICLES.	
VENEREAL STATISTICS OF THE ARMY AND NAVY: A STUDY OF CERTAIN PUBLISHED REPORTS.	
By Captain C. E. Riggs, Medical Corps, U. S. N.....	179
REPORT OF ONE HUNDRED COMPOUND FRACTURES DUE TO SHELL FRAG- MENTS OR MACHINE-GUN BULLETS.	
By Lieutenant Commander A. L. Clifton, Medical Corps, U. S. N..	191
A DEATH FROM NOVARSENO BENZOL.	
By Lieutenant Commander R. A. Torrance, Medical Corps, U. S. N.....	193
MERCUROCHROME—220, IN DENTISTRY.	
By Lieutenant Commander W. L. Darnall, Dental Corps, U. S. N..	194
PROGRESS IN MEDICAL SCIENCES.	
GENERAL MEDICINE.—Diagnosis and treatment of pulmonary tuber- culosis.—The clinical recognition of syphilis.—Mercury bichloride intravenously.—Transduodenal lavage.—Immunization against diphtheria.—Buccal auscultation.....	197

CONTENTS.

V

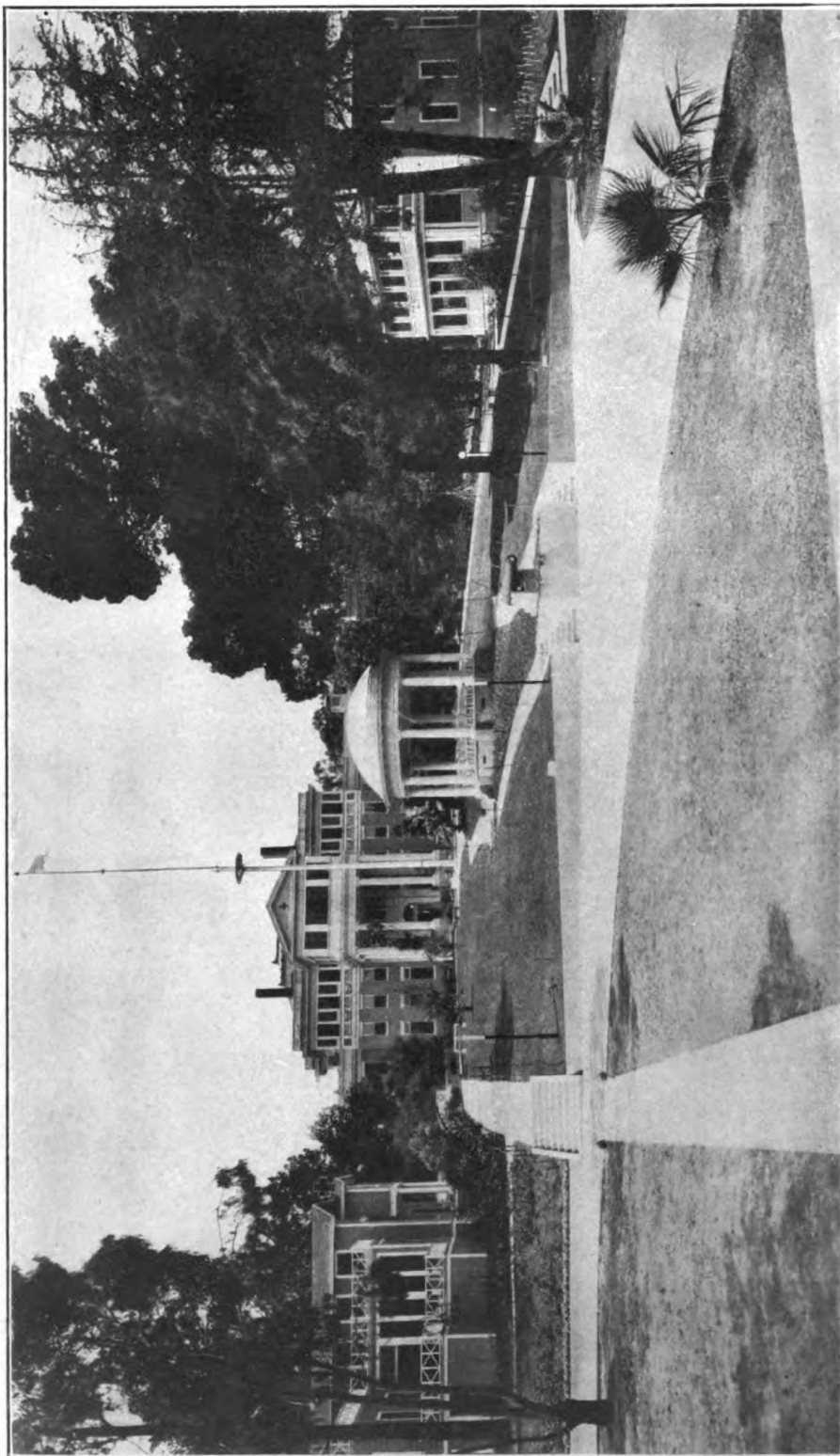
PROGRESS IN MEDICAL SCIENCES—Continued.

MENTAL AND NERVOUS DISEASES.—Malingering.—Extending the field of conscious control.—The patient himself.—Anxiety and fear.....	Page. 210
SURGERY.—Blood transfusion.—Dangers of transfusion.—Mixture of ethyl chloride, chloroform, and ether for anesthesia.—Skin grafting.—Autoplasties for baldness.—Bladder tumors.....	217
HYGIENE AND SANITATION.—Hospital fires.—Coffee and vitamins.....	223
TROPICAL MEDICINE.—Sterilization of ova in bilharziasis.—Antimony in the treatment of bilharziasis.....	226
EYE, EAR, NOSE, AND THROAT.—Cause and diagnosis of glaucoma; treatment by myotics.—Corneal disease of tubercular origin.—Action of chloral on the pupil.....	227
NOTES AND COMMENTS.	
Enlistments.—Professional training of experienced officers.—The case of the U. S. S. <i>Pittsburgh</i> .—Prostatic lithiasis.—Cessation of respiration 15 hours before death.—Chloropicrin to exterminate rats.—The Annual Report of the Surgeon General, U. S. Navy.—Finding malarial parasites.—Icterus in malaria.—Excretion of quinine.—Student health at the University of Iowa.—Conference on war victims.—Pleasure and profit in the Medical Corps of the Navy.—Law regarding thermometers.—Adhesive plaster.—The essential in nursing.—Laxative cookies.—Samoa.—The Navy Mutual Aid Association.....	235
BOOK NOTICES	251



Copyright Harris and Ewing.

Surgeon General E. R. Stitt, B. A., Ph. G., M. D., LL. D., D. Sc., Rear Admiral, Medical Corps,
U. S. Navy.



Main façade, U. S. Naval Hospital, Mare Island, Calif.

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

E. R. STITT,

Surgeon General United States Navy.

VII

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All material supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U.S. NAVAL MEDICAL BULLETIN.

Vol. XV.

JANUARY, 1921.

No. 1.

SPECIAL MARE ISLAND HOSPITAL NUMBER.

HISTORICAL SKETCH OF THE U. S. NAVAL HOSPITAL, MARE ISLAND, CALIF.

By A. FARENHOLT, Captain, Medical Corps, United States Navy.

Mare Island first came to the attention of the Navy in 1850 when Lieutenant Simon F. Blunt, on special duty and acting under orders of Commodore John D. Sloat, commander in chief, Pacific Fleet, examined all possible sites on the bay of San Francisco and near-by waters with the view of selecting a suitable spot for a navy yard. The two locations especially considered were those of Sausalito and Mare Island. The former had a certain attraction for the men and vessels of the "old Navy" and for years the storeship *Warren* was anchored there as a station or port guardship for San Francisco. Mare Island was selected and purchased from Aspinwall & Co., January 4, 1853, for \$83,000. In September, 1853, civilian artisans arrived and for one year were busy assembling a floating dry dock sent out from the East. One year later Commander Farragut arrived to take command. A diary is extant in the handwriting of Commander Farragut, and the first entry relating to the yard states:

"Sept. 16, 1854. Took charge of the island and forthwith ordered all squatters off. Weather clear.

"Sept. 18th, 1854. Sloop of war *Warren* came up to be moored as storeship for the accommodation of the yard."

The medical history of the station, therefore, dates from the day of the *Warren's* arrival, and her medical officer, Assistant Surgeon John M. Browne, U. S. Navy, was, therefore, the pioneer medical officer. No quarters of any kind for the accommodation of the sick were erected ashore, and the ship continued to be a dispensary and hospital for the very few officers and men employed until the arrival of the razee frigate *Independence*, October 2, 1857. On October 28, 1857, the crew of the *Warren* were transferred to the *Independence*, and the latter ship took over the duties of station and receiving ship, which she continued until November 2, 1912, a long, active career of 55 years.

Until the arrival of the *Independence*, and for some time subsequently, all sick were housed on board these two vessels. Some

stores were, however, kept on shore. On January 6, 1862, the medical officer writes as follows:

"SIR: * * * Up until this time the medical stores have been kept upon the same floor and in the same building with the naval storekeepers' and pursers' stores, and there has not been any room assigned as a dispensary. As a consequence the medicines and stores for daily issue in the yard have been kept, some at the surgeons' quarters, some again at the stewards' quarters, and still others on board the *Independence*, in every way an inconvenient arrangement.

"I found a storeroom and dispensary nearly completed and ready for use on my arrival and I will occupy them, if the rains permit, this week * * *.

"The dispensary furniture now on charge is in a most dilapidated and worn-out condition, and in quiet times I would ask to have them surveyed.

"I am, very respectfully, your most obedient servant,

"WM. S. BISHOP.

"WM. WHELAN, M. D.,

"*Chief of the Bureau of Medicine and Surgery,*

"*Washington, D. C.*"

The open decks of the *Independence* and the lack of heat made the ship a poor habitation for the sick, and later in January Dr. Bishop wrote:

"A number of catarrhal cases occurring on board the U. S. Frigate *Independence* makes in my opinion the necessity that a stove should be erected on the gun deck for their use.

"My attention has been called to the fact that the head used by men sick and well is exposed to the inclement weather. A few square yards of canvas or tarpaulin will remedy this and protect completely, while constructed by such arrangement as to allow its being thrown back when the weather is good, thus securing ventilation and cleanliness."

The forlorn condition of the sick must have troubled the good doctor deeply, for on April 16, 1863, he wrote to the Surgeon General:

U. S. NAVY YARD, MARE ISLAND, CAL.,

April 16, 1863.

SIR: The necessity of some temporary hospital accommodations on this station is becoming imperative. * * * There has been scarcely a day that two at least of the patients on my list ought not to have had hospital treatment.

The frigate *Independence*, particularly in the winter season, is a very unsuitable place to treat the sick—it is cold, wet, and open to every wind that blows. * * * The ward room is occupied by the

sergeants' wives and company laundresses, so I can't use it for the sick.

Accompanying, you will find a proposition that I made to Captain Selfridge, with the plans and estimated cost, that will give us accommodations for 20 beds, and in an emergency by using the chapel we could put up 40 beds. * * *

Captain Selfridge has not given any reply to my suggestion made some time since. Should this plan meet your approval, it will give us convenient and comfortable, though limited, accommodations for the time the permanent hospital will be in construction and at a very small expense.

I need not remind you that there is not on this station, and will not be until the completion of the hospital, a single bed for the use of the sick or wounded other than cots on board the *Independence*.

I am, very respectfully, your most obedient servant,

WM. S. BISHOP.

WM. WHELAN, M. D.,

Chief of the Bureau of Medicine and Surgery.

Washington, D. C.

The Surgeon General reported under date of May 13, 1863, that he had recently seen at Newport, R. I., a frame building erected on the spar deck of the *Constitution* for the accommodation of sick officers of the Naval Academy, and recommended the same course to be taken at Mare Island. In obedience to this recommendation, in the fall of 1863, the ship was completely housed over.

The bureau recognizing the necessity for greater facilities at this station communicated with Dr. Bishop as follows:

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
September 19, 1863.

SIR: The department having devolved upon this office after the 30th instant proximo the duty of supervising the erection, repair, improvements, etc., of naval hospitals, I beg to make some inquiries of you as a professional man in reference to the hospital in progress at Mare Island, California.

I may premise the remark that I am entirely ignorant of the location of the building, nor have I been consulted in regard to its capacity or internal arrangements.

Hospital architecture I need not observe to you has become almost a specialty; it embraces ideas and adaptations outside the general scope of the profession, and is never successful unless persons familiar with the peculiar province of a hospital are associated at least suggestively with the mere mechanical arrangements of house building.

A first requisite is a judicious site. What is your opinion on this point? Has it been selected with any special reference to the character of the soil avoiding new made or marshy land and with proper facilities for drainage, sewerage, etc.?

What is the proposed frontage of the building and how will it conform to prevailing winds, etc.? Are there marshes or low, moist lands in the vicinity which in consequence of prevalent winds might subject the hospital to any prejudicial influences?

These topographical considerations are of prime importance and should be carefully weighed.

Large, compact buildings seem to be no longer in favor for hospitals, as they do not present the most favorable conditions for light, ventilation, etc.

The most modern structure, the free city hospital at Boston, consists of a central and detached building connected by corridors which may be opened, or closed, as appropriate, and I believe the plan meets the decided approval of the most eminent medical men of that vicinity.

This plan admits of ready extension as necessity requires and on the other hand avoids the immediate construction of a building larger than may ever be needed.

I will thank you for full information upon the points I have indicated as well as any other matter pertinent to the subject. * * *

Very respectfully,

W. WHELAN.

P. A. Surgeon WILLIAM S. BISHOP,

U. S. Navy Yard, Mare Island, California.

Dr. Bishop replied, describing the location, proposed plans, etc.

U. S. NAVY YARD, MARE ISLAND, CALIFORNIA,

October 19, 1863.

SIR: A lithograph of the navy yard and Vallejo, printed from a photograph, has been issued within the last two or three months and which I inclose herewith. By its aid you will get a better idea of the topography of the island and its improvements than I can possibly convey to you by description * * *.

Our commandant is converting an old granary by removal and repair into a temporary hospital, the expenses of which he expects to pay out of the hospital appropriation * * *.

By finding figure 1 on the lithograph you will see the site of the hospital as first located on the general plan of the yard. Figure 2 gives you the site selected by Drs. Johnson and Lyman; Mr. Brown, engineer of the yard; and myself, under an order from the commandant of the yard several months since * * *.

The objections to the original site were its bleak exposure, pointing southwest, to the prevailing cold, heavy summer winds, its level.

flat surface making drainage, sewerage, and surface watershed difficult, and its too close proximity to the new marine barracks No. 5, now under contract for erection.

It will strike you as singular the necessity of a lee or shelter from summer winds, but such is the case here; our three summer months being the most unpleasant and uncomfortable of the year, often make morning and evening fires a necessity to an invalid. The site, No. 2, selected by the commission, is 30 or 40 feet up on the slope of a high hill securing this lee or protection and with every facility for drainage, sewerage, and surface watershed and presenting the same frontage with the officers' quarters on the yard.

There is in front of this site a low, marshy piece of ground, or tule land as styled here, covered or bare according to tide and which extension in front of the officers' quarters on the lower part of the avenue and in this climate is not of any importance, as I have not known of a case of intermittent or bilious remittent fever having its origin upon this island. It is, besides, to leeward of the hospital site 360 days out of the 365 * * *.

The plan in its totality is designed to accommodate 140 patients, though a wing can be erected complete in itself with room for 40 patients, and by Mr. Brown's estimate within, or nearly within, the appropriated \$25,000.

In my opinion the wing will give all the accommodation needed at present and it ought to be completed in all its parts and made ready for occupancy of patients before the design as a whole is undertaken.

On receiving the plans you will see that every room or ward in the house has its own fireplace and windows fronting the open air, thus securing light and perfect ventilation, for I look upon the chimney flue with or without fire as the best method of ventilating yet hit upon. There is not any general heating apparatus in the basement for the use of the whole building as would be necessary in the same latitude in the East.

Our winters are so very mild as to require an expenditure of fuel scarcely greater than in the summer months and making the grate or fireplace quite equal to all purposes of warming.

The wings of the building and front all open upon wide, well-protected, and sheltered galleries, giving in rainy weather ample room for outdoor exercise, a matter of every importance in our soft rainy winters. You will observe how little waste of room is made by halls and passageways. I doubt if under the same roof surface as many cubic feet of accommodation could be found by any other plan. I will be disappointed if the design does not meet with your approval as a great deal of care and study has been expended upon it to adapt it to the peculiarities of climate and location.

No. 3 in red ink will show you the building 30 by 50 feet now on the site marked No. 4 in the margin with red ink designed with the improvements and additions for a temporary hospital. * * *

I am, very respectfully, your most obedient servant,

W. S. BISHOP.

WILLIAM WHELAN, M. D.,

Chief of Bureau of Medicine and Surgery,

Washington, D. C.

Dr. Bishop foresaw that the final completion of the new hospital would be long delayed (as a matter of fact it was after an interval of seven years) and urged other quarters than the *Independence* for his sick. In the summer of 1863 he wrote:

"Through the summers and dry season you may make the men comparatively comfortable but during the winter and rainy season the impossibility of keeping the ship warm and dry must always militate greatly against health and comfort. The condition of the laundresses in the wardroom without light and scarcely any ventilation is pitiable in the extreme and will account for the ill health of several of the females.

"As regards the sick I can not too strongly urge the provision of more comfortable quarters for them than the *Independence* under the most favorable circumstances can afford. For several months back I have had upon my list two cases that could they in the beginning have been properly housed, cared for, and made comfortable, would have in my opinion recovered easily and surely. Now, I see scarcely any other chance for them than a medical survey and a discharge from the service."

On October 29, 1863, the Surgeon General was apprised of the progress of the temporary hospital by Dr. Bishop:

"SIR: * * * You will also find the plan of the temporary hospital now being constructed at this yard and which will be ready for use in six weeks or two months from this time. The main building, instead of being 30 by 50 feet, as I stated in my last letter, is but 25 by 50. The left wing next the dispensary is the cottage occupied by the surgeon's steward as quarters, and was moved to its present site at the same time with the main building. This arrangement will give accommodation without crowding to 8 patients in lower ward and 16 in upper. The site is the most convenient to the surgeon's quarters as well as to the *Independence* and ships in harbor that could be found. * * *

"I propose having the cook and nurse detailed from the Marine battalion, and by drawing from the *Independence* and from the ships from which patients are received the rations in kind of such patients, I think, I can carry on the hospital without drawing very heavily upon the hospital fund after the first outfit * * *.

"Under the late antigrog law the *Lancaster* put on shore a large amount of very excellent whisky. I took the responsibility of requiring 2 barrels (80 gallons) for issue and for hospital use. It was charged for at the rate of 0.3761 per gallon.

"I am, very respectfully, yr. obt. svt.,

"W. S. BISHOP.

"WM. WHELAN, M. D.,

"*Chief of Bureau of Medicine and Surgery,*

"*Washington, D. C.*"

The station commandant ordered the temporary hospital in commission, and it was opened during the latter part of January.

U. S. NAVY YARD, MARE ISLAND, CALIFORNIA,

January 6, 1864.

SIR: * * * The arrival of cases from the U. S. *Jamestown* in the East Indies has determined Captain Selfridge to give me an order to procure the necessary appliances to receive patients into the temporary hospital. I inclose a copy of the order, though I would have greatly preferred waiting for your instructions in reply to my letter of October 19 and 29.

Though the commandant's plan of constructing this temporary hospital was not the one I would have adopted, he has succeeded in making a very convenient and comfortable place for 24 or 30 patients * * *. I am disappointed not having detailed from Major Garland's command a cook for the hospital. He tells me he has not authority to do so, but the nurse will be furnished from the battalion in the person of a very suitable man now on my sick list and not likely to recover sufficiently to return to active duty * * *.

I am very respectfully, yr. obt. svt.,

WM. S. BISHOP.

WM. WHELAN, M. D.,

Chief of Bureau of Medicine and Surgery,

Washington, D. C.

In April, 1864, Dr. Bishop reports:

"* * * In making up my daily average cost per man at 29 cents I have included all the patients treated whether admitted to the hospital or treated in barracks on board the U. S. S. *Independence* * * *. I have not yet been at any expense for wood, as fuel for the quarters has been supplied by gathering of driftwood from the beach by the convalescents. This supply can not be depended upon for the next quarter, and if I have to purchase wood at the present price of legal tenders, 48 on the dollar, will largely increase the next quarter's expenses * * *."

The question of a working force for the little hospital was always trying, and Dr. Bishop tried to obtain two negroes serving with the fleet:

U. S. NAVY YARD, MARE ISLAND, CALIFORNIA,
October 3, 1864.

SIR: * * * I am carrying on the duties of cook and nurse, the former by an invalid marine and the latter by an ordinary seaman from the U. S. S. *Saranac*, whose time is now expired. It would be economy to have transferred to the hospital, from one of the ships in this squadron, two contrabands for these duties.

A large number were sent out to the squadron from the East some months since and an order from the Sec'y of the Navy for the transfer of two of them might be obtained and the interests of the service thereby promoted.

I am, very respectfully, yr. obt. svt.,

WM. S. BISHOP,
P. A. Surgeon.

WM. WHELAN, M. D.,
Chief of Bureau of Medicine and Surgery,
Navy Department, Washington, D. C.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
November 12, 1864.

SIR: * * * I referred your request for the assignment of two contrabands for hospital service to the department; and the following reply is made thereto: "This application had better be made by the fleet surgeon to the commander of the squadron in the Pacific, as the department would hesitate to order men who shipped for the Navy to perform duties as assistants in the hospital. Volunteers among the contrabands, no doubt, can be obtained."

Perhaps by acting upon this suggestion you may be able to accomplish this object.

Very respectfully,

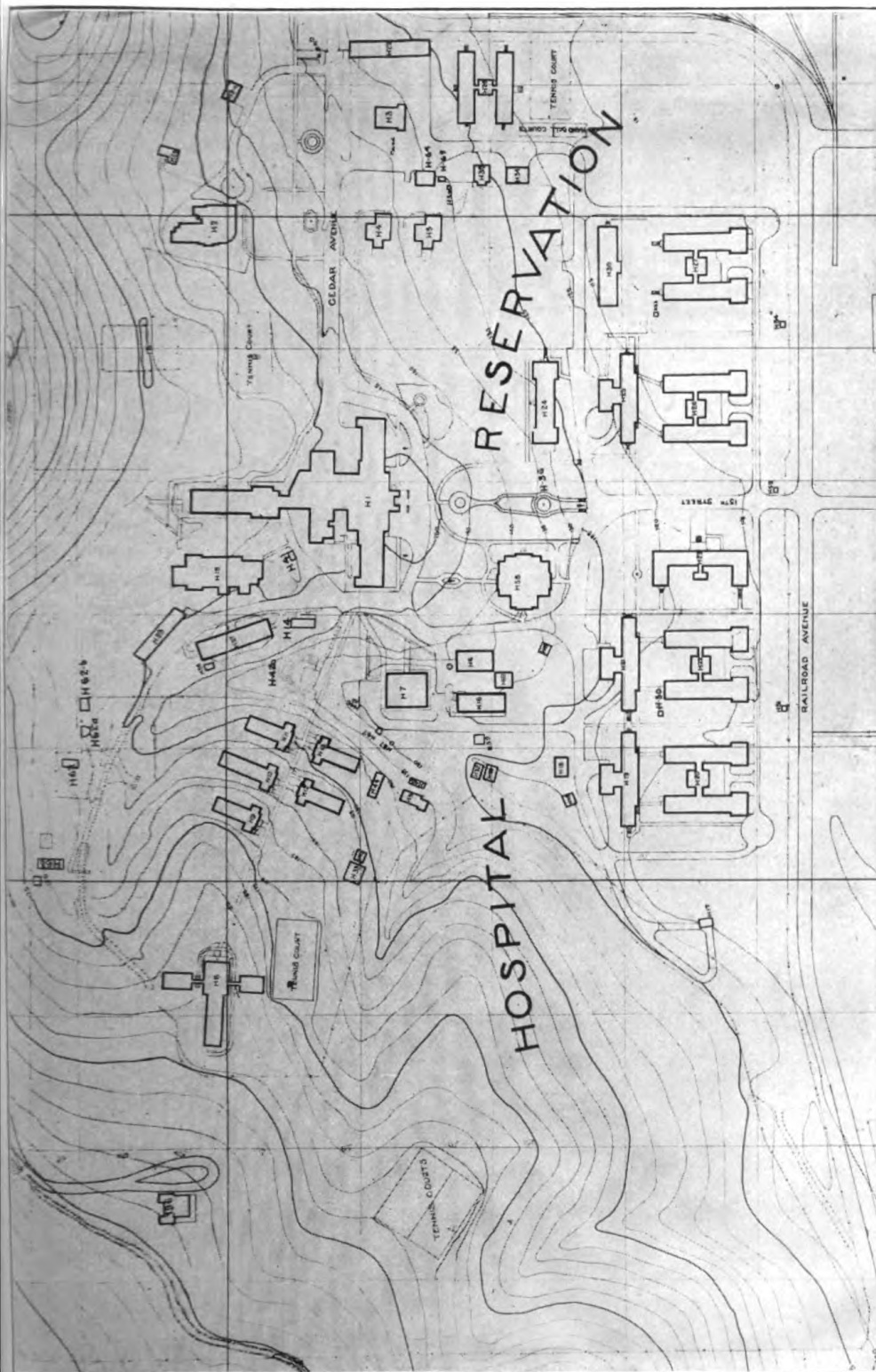
W. WHELAN.

P. A. Surgeon, WM. S. BISHOP,
Navy Yard, Mare Island, Cal.

It was not until November, 1865, that the following allowance was made:

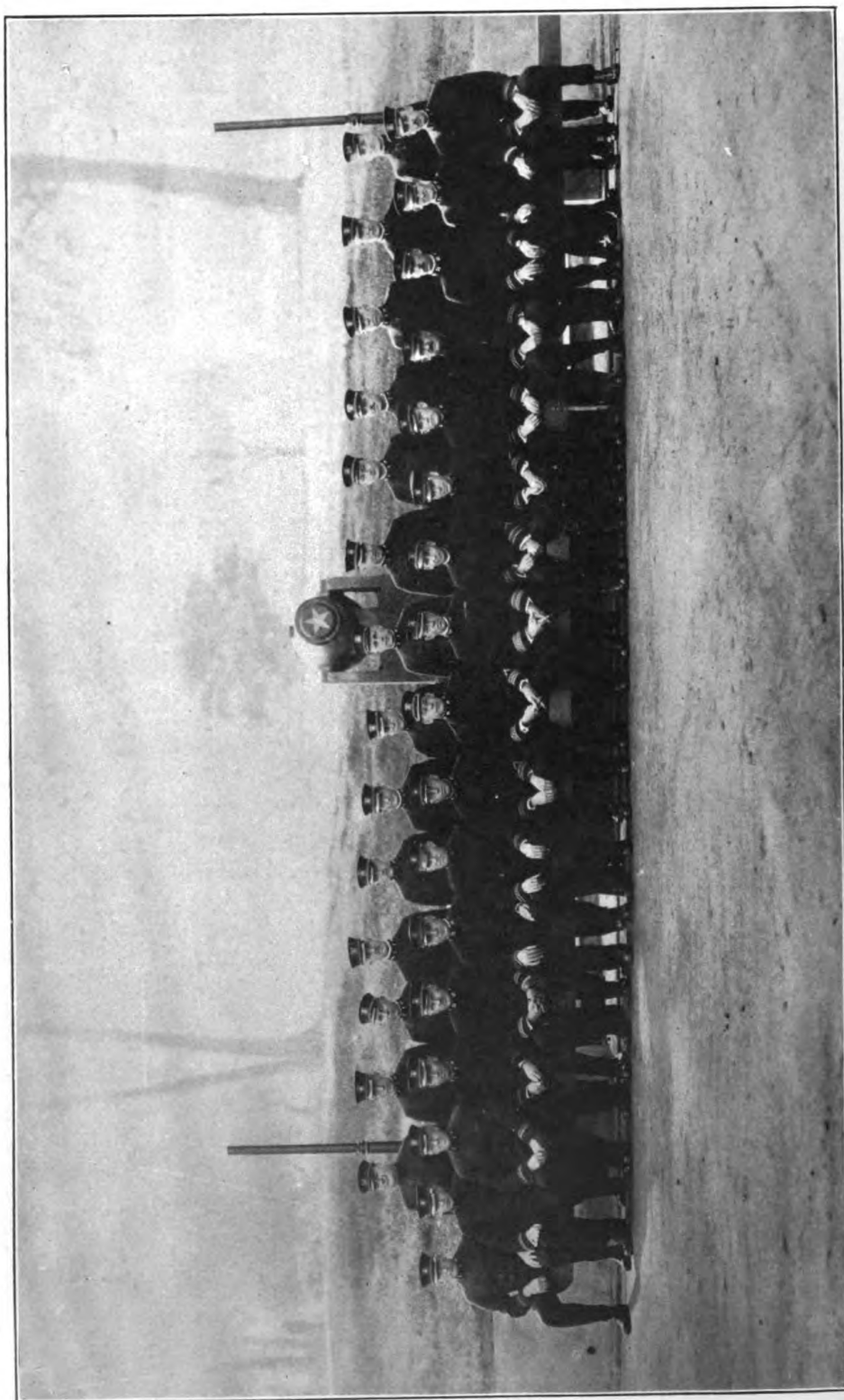
1 cook	-----	\$45 per month.
2 nurses	-----	28 per month.

The maximum number of nurses will be retained only when the crowded state of the hospital makes it necessary.

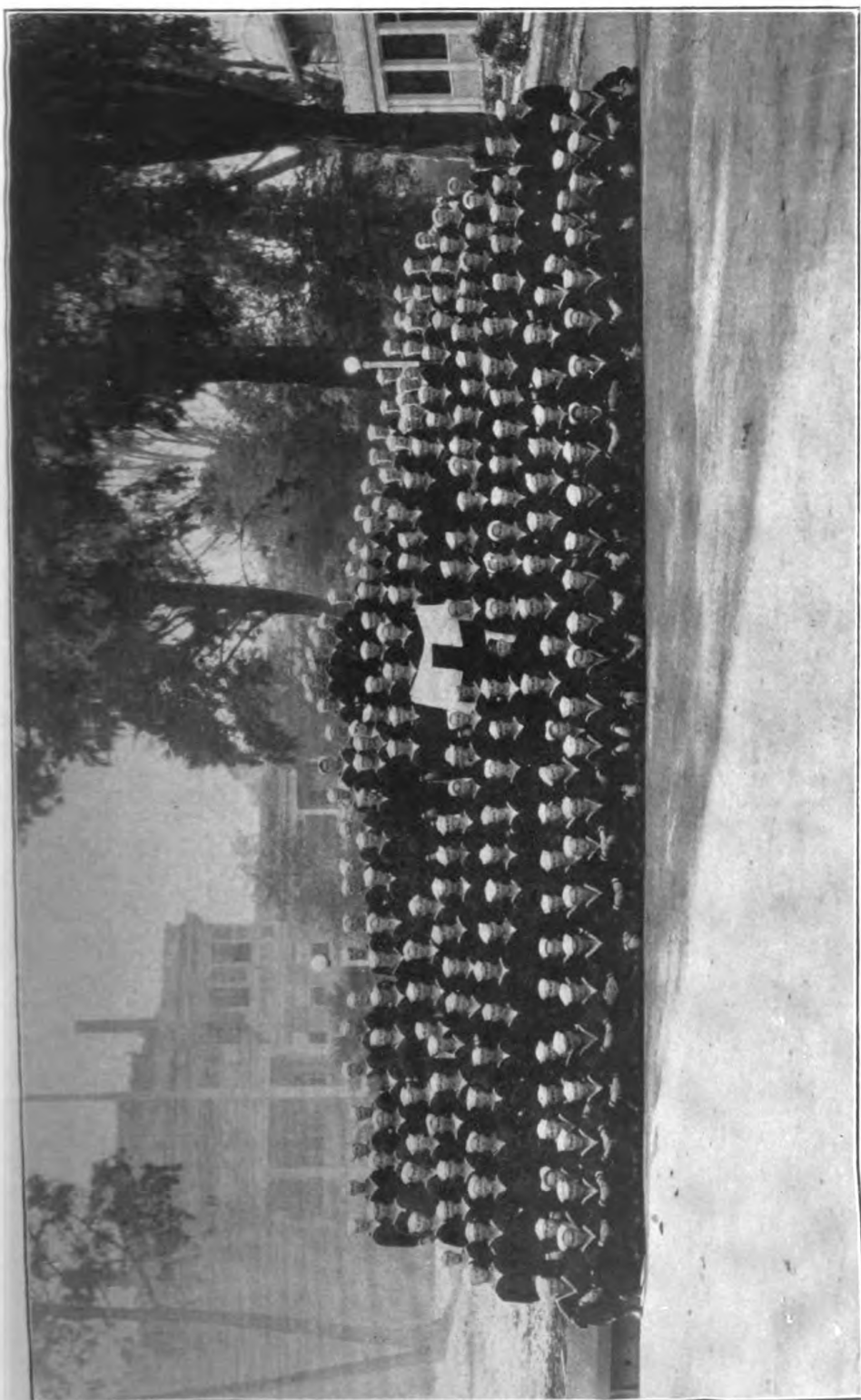


Plan of grounds and building, U. S. Naval Hospital, Mare Island, Calif.

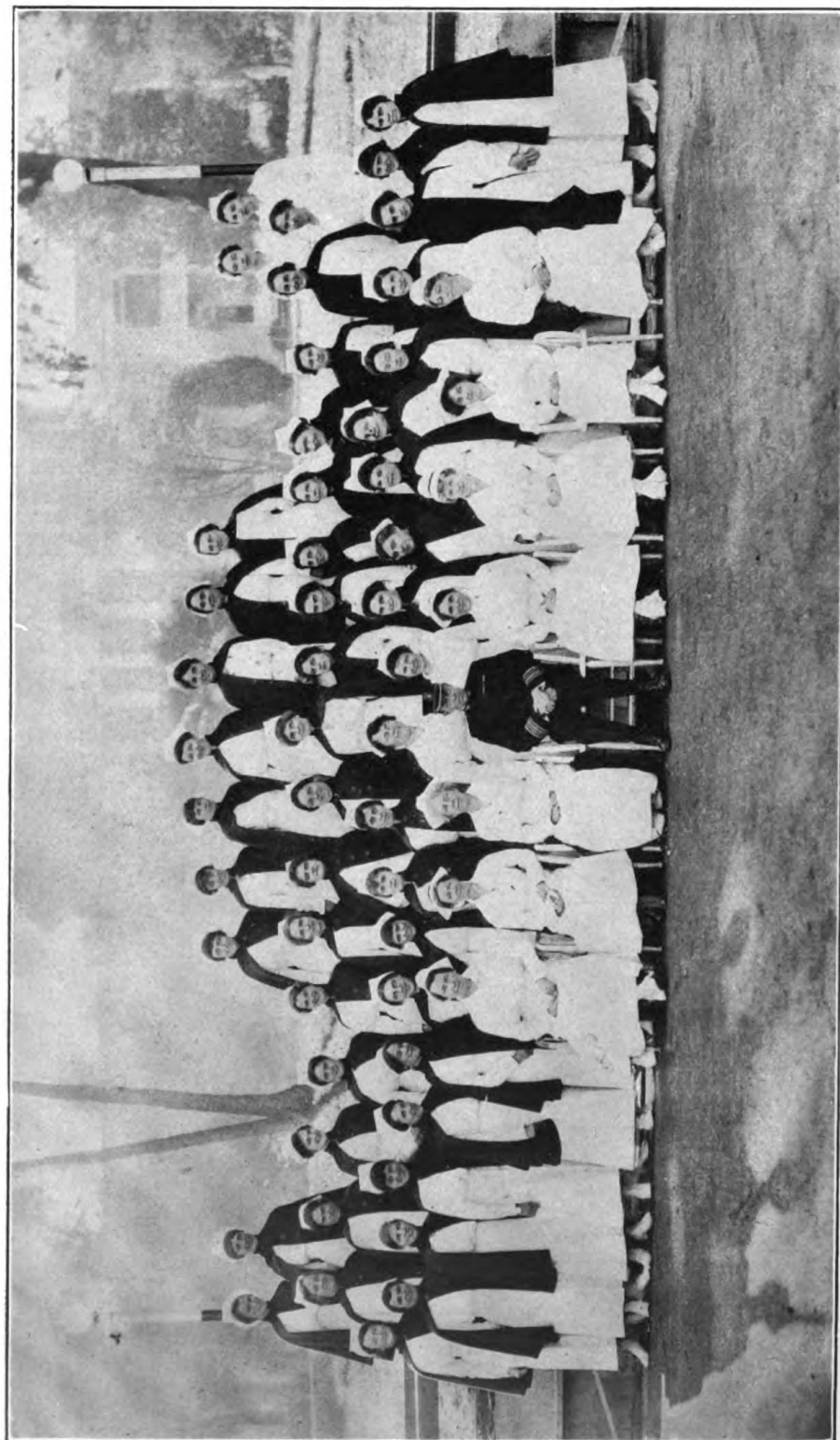
8-1



Medical Staff, U. S. Naval Hospital, Mare Island, Calif.



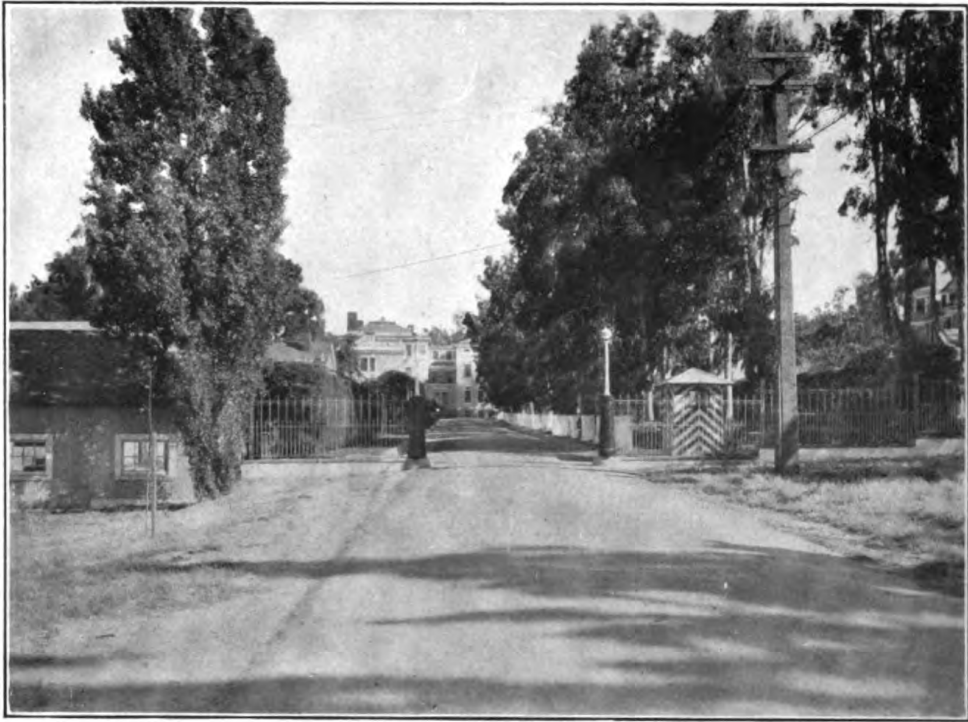
Hospital Corps personnel, U. S. Naval Hospital, Mare Island, Calif.



Commanding officer and members of the Nurse Corps, on duty at the U. S. Naval Hospital, Mare Island, Calif.



Nurses' Quarters, U. S. Naval Hospital, Mare Island, Calif.



Main gate, U. S. Naval Hospital, Mare Island, Calif.

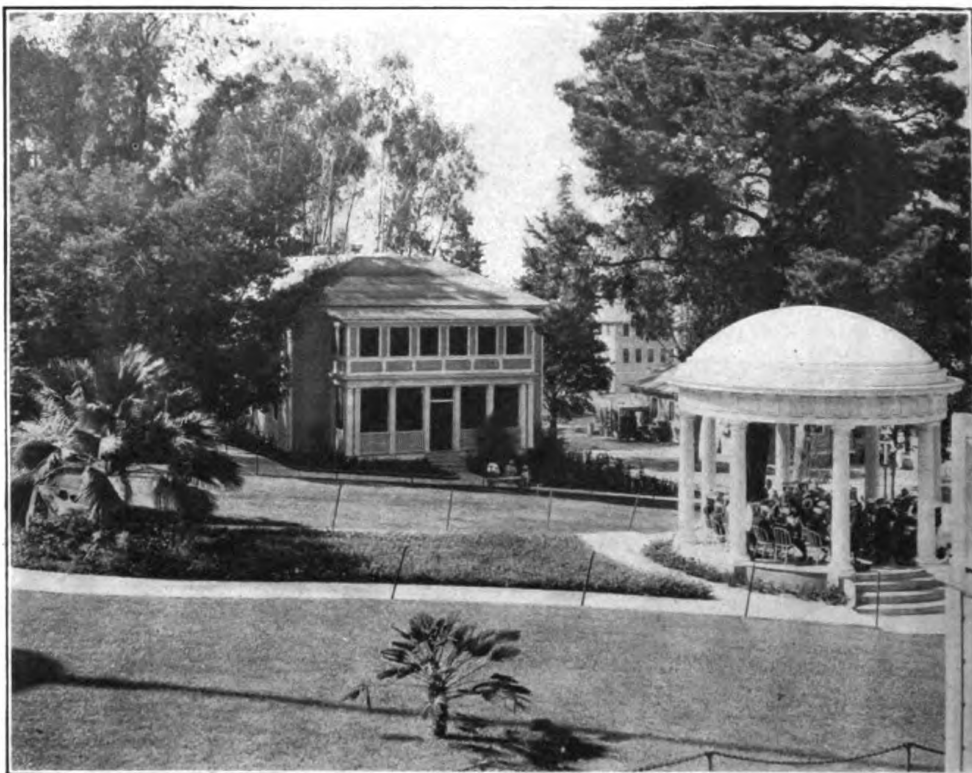


Main building, U. S. Naval Hospital, Mare Island, Calif.



Views in the grounds, U. S. Naval Hospital, Mare Island, Calif.

8-7



Red Cross Building and the band stand, U. S. Naval Hospital, Mare Island, Calif.



Interior of Red Cross Building, U. S. Naval Hospital, Mare Island, Calif

8-9



Views of Nurses' Quarters, U. S. Naval Hospital, Mare Island, Calif.

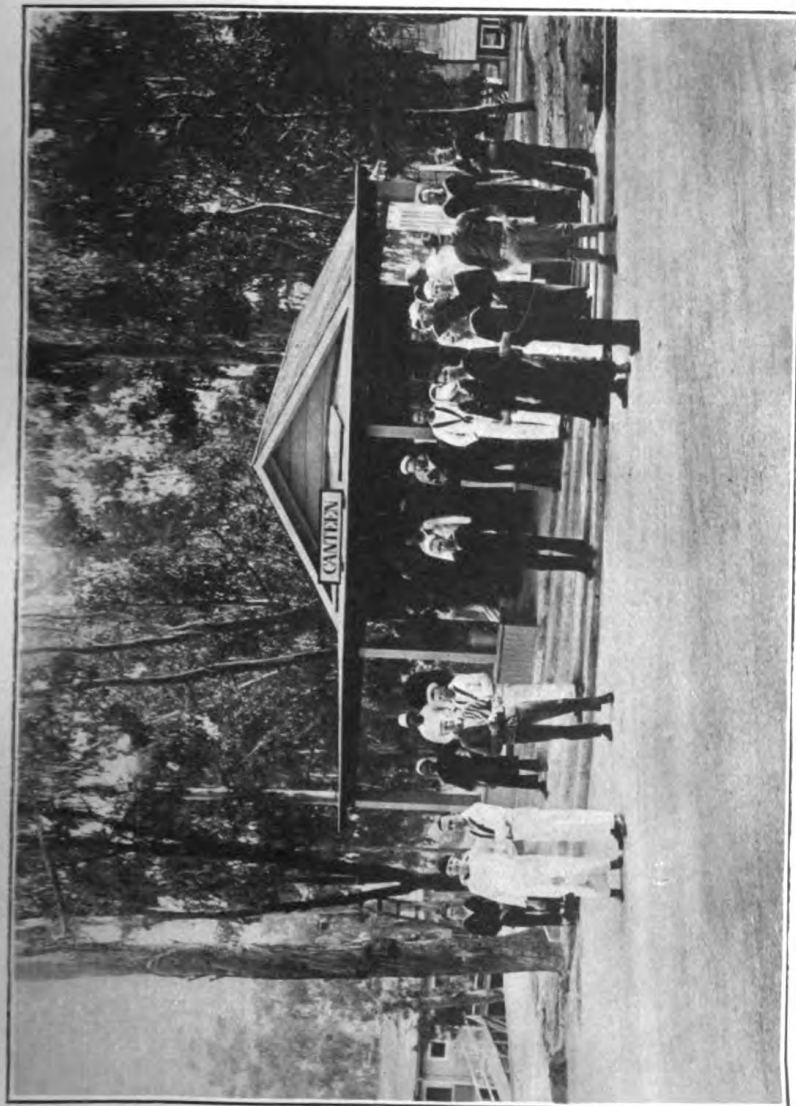
8-9



Unit No. 14, buildings of the U. S. Naval Hospital, Mare Island, Calif.

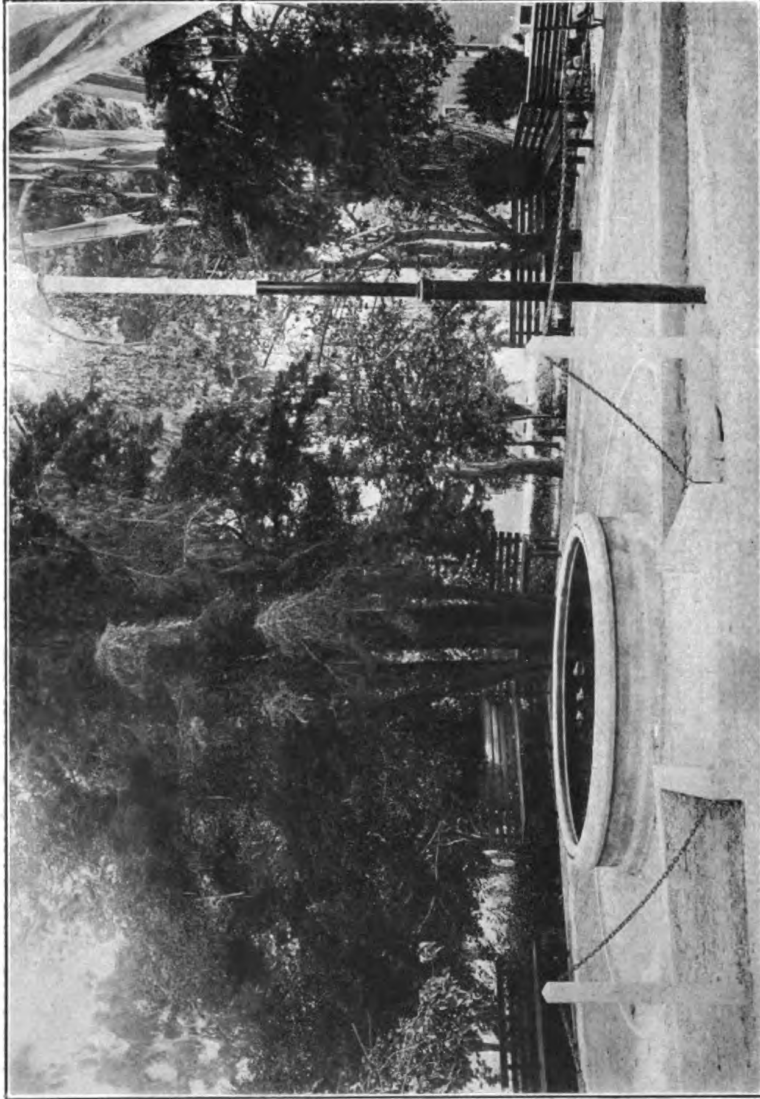


8-10 Morgue, laboratory, and garage, U. S. Naval Hospital, Mare Island, Calif.



Canteen or ship's store, U. S. Naval Hospital, Mare Island, Calif.

8-11



A view of the grounds, U. S. Naval Hospital, Mare Island, Calif.

About this time the busy doctor asked for a horse to help him cover the long distances. This being denied, he applied for an assistant, and in February, 1866, Passed Assistant Surgeon George W. Woods arrived.

In 1868 the new permanent hospital was commenced. Its plan and appearance closely resembled that of the then recently completed brick hospital at Philadelphia. They were more nearly "sister hospitals" than any two erected before the type structures were adopted.

The main ward building was completed and occupied in 1870. Until 1892 the senior medical officer occupied an entire ward as living quarters, and the assistant's rooms were over the entrance.

In 1898 the brick structure was badly damaged by earthquake and had necessarily to be condemned. The sick were temporarily removed to the north wing of the Marine barracks and there remained until the new structure was completed in April, 1900. The act of Congress authorizing this building specified that the basement of the former hospital should be utilized; thus limiting the ground plan to the structure of 1870.

In 1905 the west wing, planned as a surgical unit, was erected. In 1908 five 18-bed pavilions were erected on a near-by hill. Little other construction was permitted until the outbreak of the recent war. At that time the main hospital building held a maximum of 212 beds. The 16 nurses occupied the old pest house and the hospital corpsmen occupied tents. Since that date eight new ward buildings have been erected, having a maximum bed capacity of 700, giving us a total bed capacity under roof of 1,000, and tent platforms, heads, mess tents, etc., are permanently kept in readiness to house an additional 500.

The following structures have recently been erected:

New nurses' quarters, 37 beds (old quarters 38).

Hospital Corps quarters, 150 beds.

Red Cross convalescents' building, with barber shop, tailor shop, post office, library, and Hospital Corps recreation room.

Theater building (converted).

Open-air arena, seating 900.

Canteen building.

Civilian employees' quarters, capacity 110.

Two garages, 30 stalls.

Laboratory building.

Additional sick officers' quarters building.

Band stand.

Gas-generating house.

Incinerator.

Animal house.

Extensions to green house, paint shop, morgue.

17908—20—2

Storehouse for inflammables.

Complete reorganization of galleys, diet kitchens, central filing room, etc., has been accomplished.

We have at present 60 buildings on the hospital reservation of 27 acres.

OPERATING-ROOM TECHNIQUE.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy, and
BESSIE C. GRAHAM, Nurse Corps, United States Navy.

The operating-room technique here described is the method in use at this hospital. It is simple, satisfactory, and with slight modification suitable for use on board ship. Special attention is paid in our surgical service to the training of hospital corpsmen as surgical assistants and anesthetists, who can perform these duties on board ship and at small stations where there are not always enough medical officers. The hospital corpsmen scrub up and handle all the sterile goods and instruments during operations under the direction of the operating-room nurse. They are taught how to put up sterile goods, gloves, and glassware, make solutions, pick out instruments for various operations, and generally care for the operating rooms. They frequently act as assistants to the operating surgeon, and they give the anesthetics under the direction of a medical officer. This training has produced a number of hospital corpsmen of a very high degree of skill who would be a joy to any medical officer under whom they might serve, and the training has never worked to the detriment of the patients.

Routine cleaning of the operating suite consists of daily swabbing of the floors and wiping with a damp cloth all surfaces that might collect dust. Each week the walls, floors, and furniture are scrubbed with soap and water; the chandeliers, which are nickel plated, and the other dust catchers are daily wiped with a damp cloth and dried.

Sterile goods are twice sterilized before using; the first sterilization lasts 40 minutes under 18 pounds steam pressure; the second sterilization, 24 hours later, lasts 20 minutes under 18 pounds pressure. Enameled ware is sterilized for 30 minutes under 18 pounds pressure; glassware and rubber goods 15 minutes under 15 pounds pressure.

All sterile supplies are assembled in bags of double thickness of muslin. The emergency bag contains the following articles, which are sufficient for one operation:

4 gowns.

2 sheets, one folded lengthwise for the instrument table, one folded square for cover of basin stand.

1 lap sheet.

1 pillow case to cover instrument stand.

18 towels.

2 skin sheets, made of muslin, 18 by 18 inches, hemmed.

1 appendix apron, 4 layers of gauze, 12 by 12 inches, with a slit from one side to the center, all edges overcast.

4 applicators.

4 pieces of tape, each 12 inches long.

1 bag of sponges.

1 roll of gauze, cut in pieces 8 inches square.

12 gauze packs, 4 square, 12 by 12 inches; 4 long wide, 20 by 6 inches; 4 long narrow, 20 by 3 inches.

Wound dressings, folded gauze, 2 by 4 inches.

Canvas saddle with Crossen sponges, one wide, two narrow.

A double muslin cover is laid out smooth, a sheet folded lengthwise is placed on it, the articles enumerated above are then placed on the sheet. The ends of the sheet are brought together and pinned, the outer cover is then put on and pinned. When the bag is to be used the outer cover is unpinned by some one who is not sterile, leaving the inner sheet to be unpinned by the hospital corpsman who is sterile. The sheet serves as a cover for the sterile goods table. Large bags are employed for routine use, containing double the contents of the emergency bag. Packages containing small amounts of the above articles, sterilized, are always on hand to replenish the bags as needed. All sterile goods are always resterilized weekly and all sterile goods necessary for routine operating days are resterilized on the morning of operation.

Gauze-taped sponges are made of six thicknesses of gauze with edges sewed in and cotton tape sewed firmly to one corner. Square sponges are made 14 by 14 inches which, when washed, make sponges 12 inches square. The long, narrow sponges are 20 by 3 inches long, and the long, wide sponges 20 by 6 inches. When these are used in the abdomen a hemostat is clamped to the tape. The Crossen sponges are 5 yards long and of two widths, the wide 9 inches and the narrow 3 inches, and are made of six thicknesses of gauze. The pockets to hold the Crossen sponges are made of canvas or duck, 24 by 18 inches, folded crosswise and stitched at each end and down the center to form a double pocket. Two of these are fastened together by straps of canvas 2 by 12 inches and 12 inches apart, making a saddle. This saddle is placed over the abdomen with one pocket hanging down each side of the patient. A Crossen sponge is placed in the pocket on the side of the assistant and, as the sponge is used, the soiled portion is placed in the pocket on the side of the surgeon. This provides a sponge which is always at hand and can not be lost in the abdomen.

Summer-weight pajamas, slippers, sterile face masks and caps are placed for the surgeons in their dressing room. In the scrub-up room are basins with knee control, brushes, tincture of green soap,

1 per cent aqueous solution of iodine in the arm dips and 75 per cent alcohol in a basin. The surgeons, after removing their clothes and putting on pajamas, slippers, caps, and masks, proceed to the scrub-up room, where they scrub their hands and arms thoroughly with green soap and running water; they then rinse the hands and arms, clean the nails, and repeat the scrubbing; they next submerge the arms to the elbows in the iodine solution for two minutes, rinse thoroughly with alcohol, and enter the operating room. The sterile gown is put on by the surgeon himself and tied by some one who is not sterile. After the hands are well dried and powdered the gloves are put on, carefully avoiding contact of the ungloved hand with the outside of the glove.

Sterilization of instruments, knives, scissors, tubes of catgut, needles and linen sutures is by boiling for 20 minutes in a 1 per cent solution of sodium carbonate. All knives, scissors, and needles are put in alcohol after boiling, to prevent rusting of the unplated surfaces. Tubes of kangaroo tendon are washed with green soap, rinsed with sterile water and placed in 95 per cent phenol for one-half hour, then rinsed with alcohol before opening. Silkworm gut in tubes is boiled with the instruments. If in bundles it is trimmed, scrubbed, rinsed, and placed in glass tubes 12 inches long to prevent curling; it is then boiled in these tubes with the instruments. Horsehair, of which we use a great deal for plastic work, is scrubbed with soap, water, and a brush on a flat surface, boiled for 10 minutes in clear water, then put in 95 per cent alcohol. Silk on spools or in tubes is boiled with the instruments. Wires are removed from hypodermic needles and plungers from syringes while boiling, glass syringes are wrapped in gauze to prevent contact of glass surfaces while boiling.

Enamel-ware articles are prepared for routine operations as follows:

- 3 hand basins, for alcohol, sterile water and bichloride.
- 1 pitcher for normal salt solution.
- 1 oblong pan for instruments.
- 1 square pan for knives, scissors, and needles.
- 3 pus basins.
- 3 small bowls.

The emergency set of instruments is the basic outfit for all operations. It is kept always ready for immediate sterilization and consists of:

- 3 scalpels, 1 for the skin.
- 5 scissors; 1 curved Mayo, 2 straight Mayo, 2 blunt for sutures.
- 2 thumb forceps.
- 2 rat-tooth forceps.
- 20 hemostats, 5½-inch.
- 8 Allis forceps.

12 Carmalt's curved forceps, 6½-inch.
 2 Parker retractors.
 2 Kelly's abdominal retractors.
 1 Kelly's narrow abdominal retractor.
 1 Mayo-Balfour self-retaining retractor.
 1 grooved director.
 1 probe.
 1 dry dissector.
 2 medicine glasses.
 3 needle holders; 2 Hegar, 1 Richter.
 9 needles; 2 Loopuyt skin needles, 4 Mayo fascia, 2 small intestinal, 1 large needle for tension sutures. In a piece of bandage are kept 2 straight and 2 curved intestinal needles threaded with linen.
 2 rubber drainage tubes.
 Rubber bands to hold cuffs of gloves.
 Split shot and shot compressor.
 Plain gut in tubes, Nos. 0, 1, 2, and 3.
 Chromic gut, in tubes, Nos. 1, 2, 3, and 4.
 Silkworm gut, coarse and fine.
 6 safety pins.
 6 bone buttons for tension sutures.

For bone work, double this amount of instruments is prepared, since no instrument comes in contact a second time with the wound until it has been resterilized.

The list given above is sufficient for almost any operation, but special preparations are necessary for certain special procedures which are carried out in the operating room. For cystoscopy and urethral catheterization we prepare as follows: The cystoscope is sterilized by formaldehyde fumes in a special apparatus or submerged in a 2 per cent solution of formalin. If the latter method is used, the crevice of the lamp connection is greased with vaseline and the cystoscope submerged only as far as the hilt. The formalin solution must be fully rinsed off before using the instrument. The following articles are boiled or autoclaved:

2 rubber catheters, size 18 French.
 2 medicine glasses.
 2 Luer syringes, 2 c. c. and 10 c. c.
 4 Luer syringe needles, 2 small, 2 two-inch.
 3 glass graduates, 50 c. c., 250 c. c., and 500 c. c.
 1 small glass funnel, with rubber tubing and medicine-dropper tip.
 4 hemostats.
 1 large forceps for handling sterile goods.
 Specimen bottles and test tubes.

Also ready and sterile are gauze, gowns, gloves, sheets, towels, applicators, liquid petrolatum, vaseline, boric-acid solution, and medicine droppers. The irrigating stand is prepared with sterile, graduated, irrigating jars and tubing with glass tips, pinchcocks and basins. The necessary solutions are nitrate of silver 2 per

cent, sodium hydroxide 25 per cent, thorium or other substance for pyelography, cocaine 1 per cent, and phenolsulphonephthalein ampoules submerged in alcohol.

For intravenous medication the following articles are prepared:

Sterile gravity salvarsan tube, with rubber tubing and adapter.

2 salvarsan needles.

1 straight needle, No. 22, for hypodermic use.

2 flasks normal salt solution; distilled water, reesterilized; sodium hydroxide solution; iodine; applicators; tourniquet; gauze; cotton; gloves; gown; and 2 towels.

Sterile instruments for venesection; scalpel, sharp scissors, rat-tooth forceps, probe with eye, 4 small hemostats, fine gut, silk No. 6, small needles.

If blood transfusion is to be done, add to the above one 50 c. c. graduate, one 500 c. c. graduate, one glass stirring rod, a lumbar-puncture needle for drawing blood from donor, and sterile sodium-citrate solution 1 per cent.

No routine preoperative or postoperative procedure is followed. Each ward officer handles this part of the work for his own patients according to his individual custom.

It will be of interest to follow the patient from the time he leaves the ward until he returns to it after his operation. He reaches the etherizing room and is placed on the operating table. The anesthetist reexamines his heart and lungs and ascertains the exact nature and site of the operation to avoid any errors. The hospital corpsman, who is to give the anesthetic, examines the mouth for loose bridge work, crowns, or false teeth, puts the operating suit on the patient, straps his hands to the table, and places another strap above the knees, rubs vaseline on the face, and makes the patient as comfortable as possible. He records in the operation book the name, rate, diagnosis, and site of operation, anesthetic, and time of starting the anesthetic. He begins the anesthesia, which he conducts under the direction of the medical officer in charge of anesthetics.

When the patient is nearly anesthetized the blanket is drawn away from the site of operation, the binder and gauze are removed, and the skin cleansed with waste ether. Another hospital corpsman, under direction of the operating-room nurse, puts on sterile gloves, places sterile towels around the site of operation, and paints the field with 3½ per cent iodine. This is allowed to dry, and then another coat is applied. Fresh sterile towels are placed around the field and one over the field. By this time the anesthesia is complete and the patient is moved to the operating room.

In the operating room the top towel is removed and the lap sheet is put on, the instrument table is placed over the patient, and the sponges placed conveniently for the assistant. After the skin is

cut the knife used for that purpose is discarded. After the superficial bleeders are caught and the fat is cut through, skin towels are clipped to the edges of the skin to exclude it and the iodine from contact with the tissues. After the operation is completed a dry dressing is applied and the sheets and towels are removed. The excess iodine is removed with alcohol and the surface dried. The complete dressing is then applied. The patient is removed to an outer room, where the necessary bandages and suspensory are applied. If it is a drainage case, the dressings are held by strips of adhesive with tapes attached. The patient is thoroughly dried with towels, a dry suit of pajamas is put on, he is well wrapped in blankets, and returned to the ward.

Unless there is some reason for changing it sooner, the first dressing is done on the tenth day. By this time the suture material is absorbed, the wound healed, and there is little danger of infection.

On routine operating days all cleaning of rooms, preparation of scrub-up room, resterilization of sterile goods and water are done by the hospital corpsmen before 8 a. m. When the nurse reports for duty she takes the less experienced men with her to pick out the instruments and to instruct them in the care of sutures, technique, and attentiveness to the wants of the surgeon. In emergency cases, when fewer hospital corpsmen are on watch, one prepares the patient, assists the anesthetist, and helps in the final preparation of the patient. The second hospital corpsman puts the emergency set, which is always ready in a pan, to boil, he wipes the dust from the chandeliers, cleans the tables with phenol, swabs the main operating room floor, and then proceeds to scrub for the operation. The nurse unfolds the outer covering of the package of sterile goods, gets the solutions, sterile water and alcohol for the basins and table, ties the gowns and brings in the instruments from the sterilizer. The hospital corpsman who first scrubs has the Mayo table set up, breaks the tubes of ligatures, and has them all threaded by the time the patient is brought to the operating room.

On routine operating days the hospital corpsman who is learning anesthesia records the time of beginning and ending of the anesthetic and the operation, the amount of the anesthetic used, and the notes on the operation. In emergency cases this is done by the senior hospital corpsman on watch.

This hospital has a special operating room for eye, ear, nose, and throat work, one for urological work and one for pus cases. Infected cases are, so far as possible, kept out of the general operating room.

THE UROLOGICAL SERVICE.

By A. B. HEPLER, Lieutenant Commander, Medical Corps, United States Navy.

The value of a special urological service in a naval hospital is evident. Formerly, in this hospital, urological cases, other than venereal, were scattered about the surgical wards. It was seen that special diagnostic procedures and nursing, to be carried out efficiently, demanded a grouping of the patients. A building containing two 40-bed wards was given over to this service, one ward for venereal patients and the other for urological cases other than venereal. A small laboratory for minor procedures pertinent to this service, an examining room, a dressing and operating room have been established. Cystoscopies are performed once or twice a week. Minor operative procedures for epididymitis and varicoceles and circumcisions are carried out in the operating room. The major procedures go to the main operating room. Records are kept which give concise but complete information and which are an incentive to accurate observation. The syphilitic record is a copy of one suggested in the *Manual of Military Urology* (published by American Red Cross, Masson et Cie., Paris, 1919), and is shown in figures 1 and 2.

The routine spinal fluid examination of luetics, especially those exhibiting secondary lesions, has revealed early central nervous involvement that gave few if any clinical signs on a cursory physical examination. The early intensive treatment of these patients has resulted, in most cases, in an improvement in the serological findings. The methods of intraspinal treatment used have been those of Kolmer, Wile, Dercum, and the reversed Swift-Ellis.

The case records for gonorrhea and the cystoscopic record are shown in figures 3, 4, 5, and 6, respectively. Routine cystoscopy with ureteral catheterization, kidney function test, and pyelogram is performed in all doubtful cases. This routine cystoscopy has been especially valuable in cases diagnosed as neurosis of the bladder, in revealing an organic basis for the supposed functional condition. Among these cases have been found diverticula of the bladder, papillary inflammation of the sphincter, pyelitis, papilloma of the bladder, cystic trigonitis, and posterior urethritis.

The following case reports are submitted in detail, having features of especial interest.

CASE 1. RENAL TUBERCULOSIS.

—, Seaman, aged 20. His chief complaints on admission were: Pain, a steady dull ache increased on exertion and located in the lumbar and pubic regions; increased frequency of urination, voiding every half hour during the day and eight or nine times during the night; painful urination, more marked at the end of the act; persist-



Plate 1.—Stricture in lower pelvic spindle of left ureter with dilatation above. Old Nitze indirect-vision cystoscope used preventing removal before roentegenogram was taken.

16-1

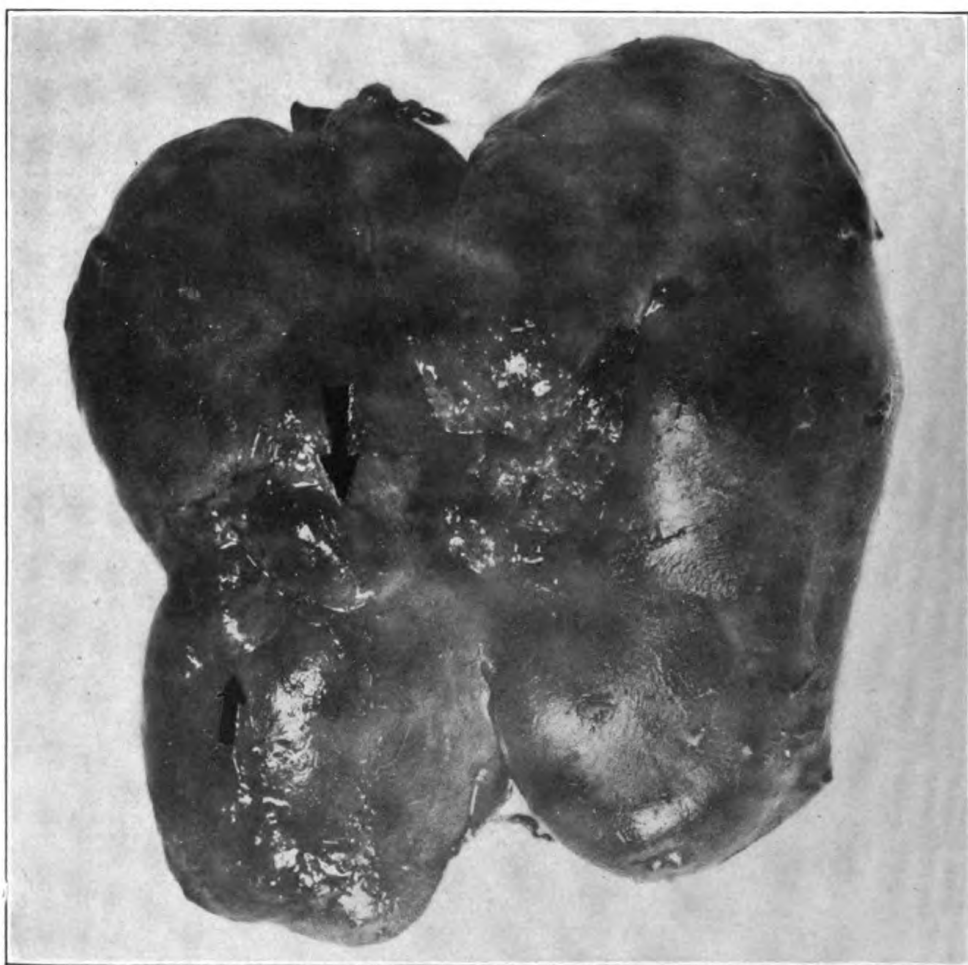


Plate II.—Renal tuberculosis. Bleblike dilatations on anterior surface, indicating abscess cavities.
(See Plate III.)

16-2

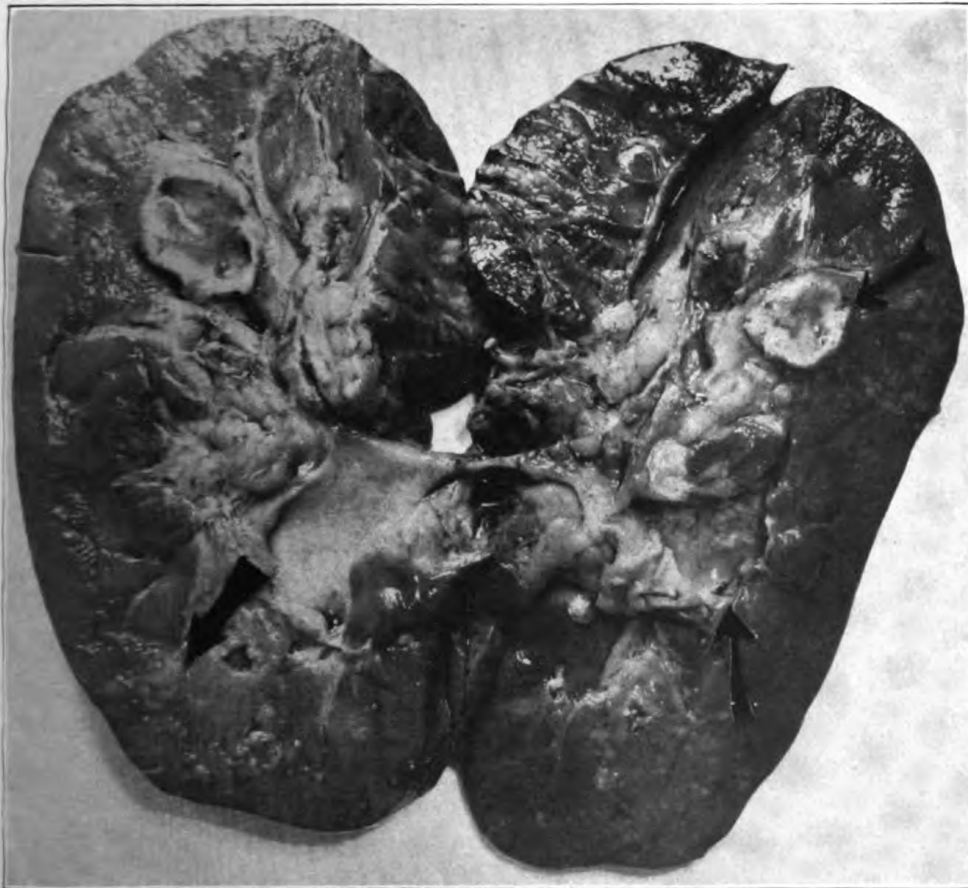


Plate III.—Renal tuberculosis, showing abscess cavities. Note tubercles at lower poles.

16-3



Plate IV.—Pyelonephritis with hydronephrosis, showing marked dilatation of left renal pelvis and ureter.

16-4

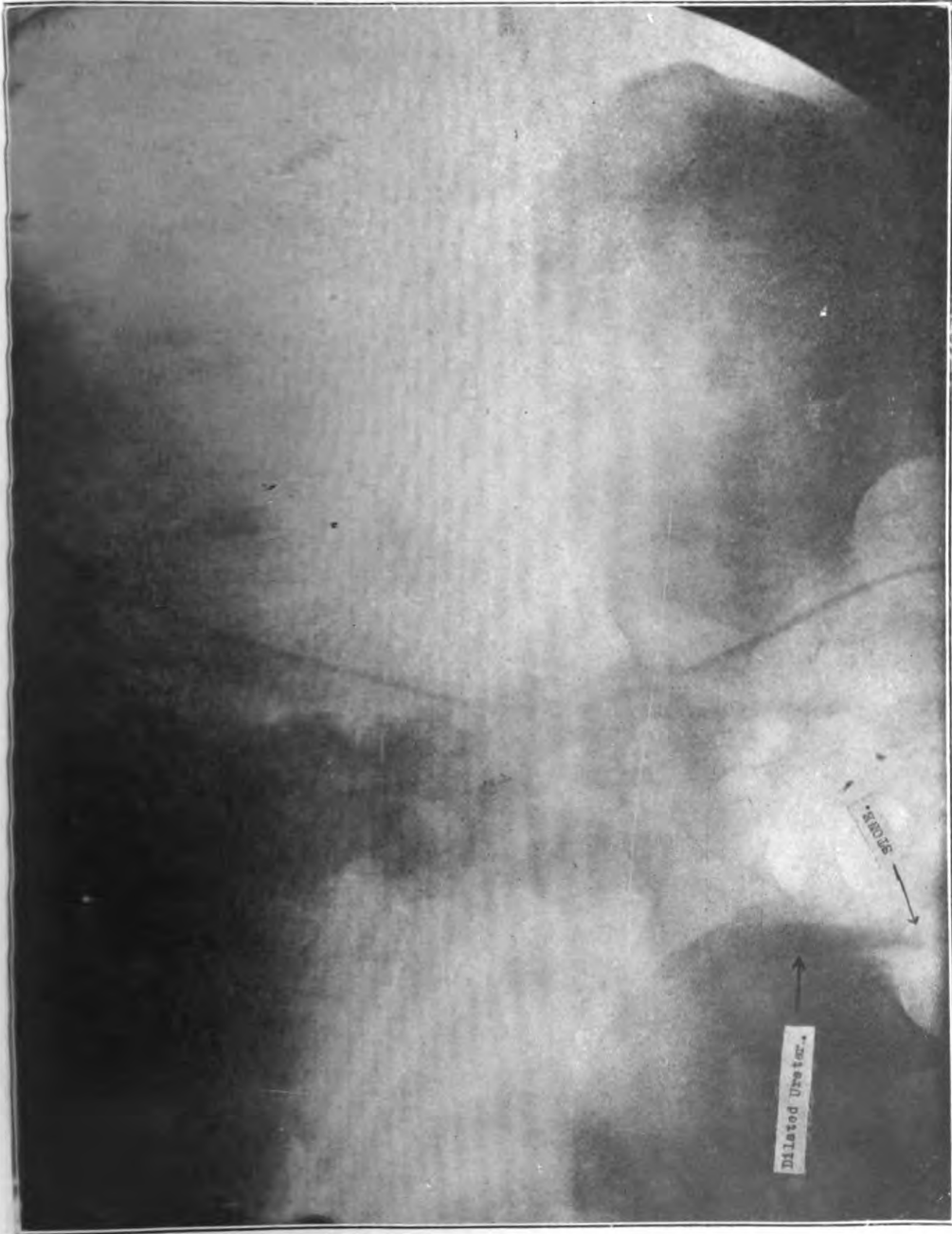


Plate V.—Ureteral calculus, left side. Above the soft stone the ureter is dilated. Normal renal pelvis on right.

16-5

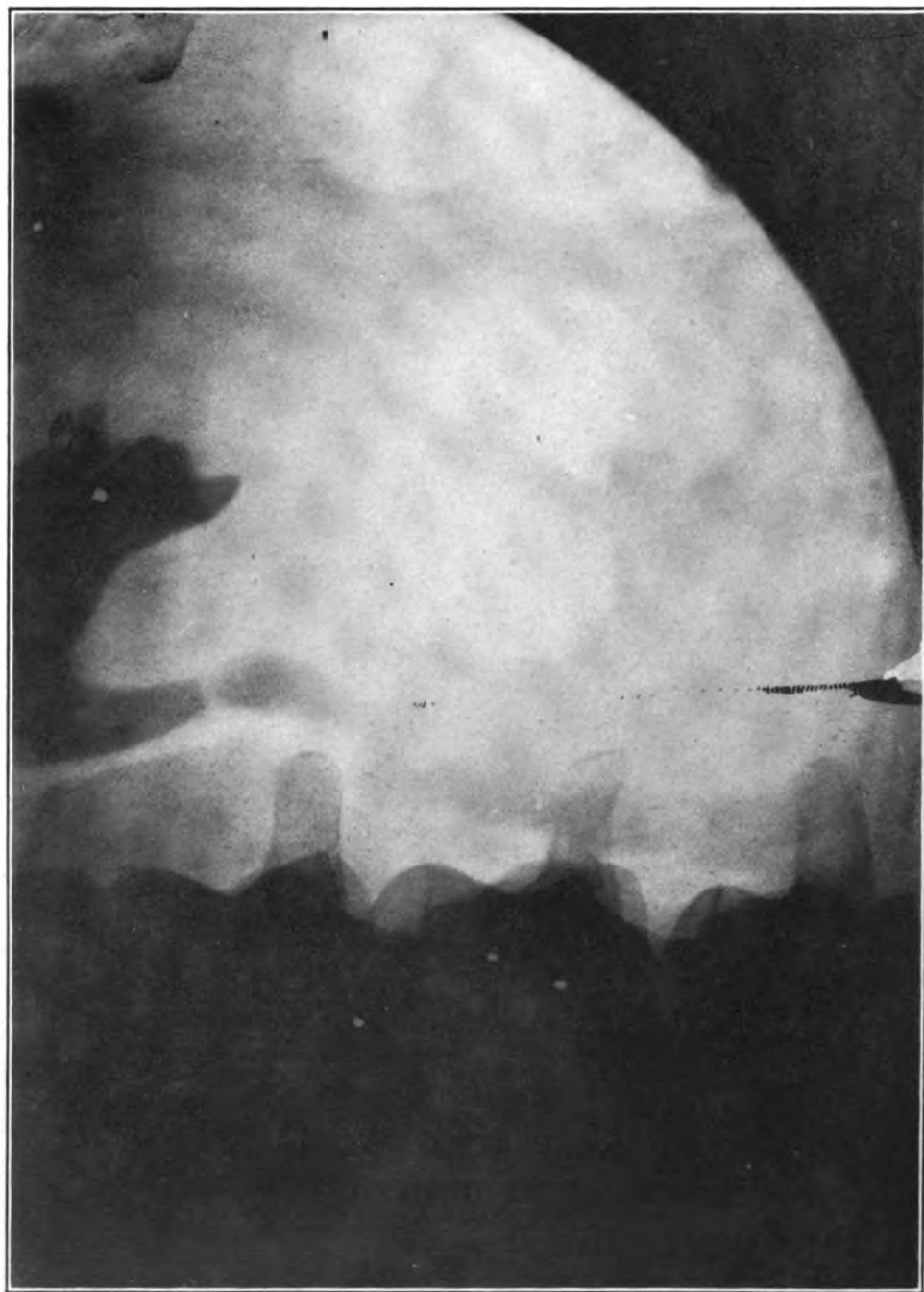


Plate VI.—Dilated ureter and pelvis (left side), above calculus. View after catheter had been inserted for 20 cm., passing the obstruction.

16-6

ent cloudy urine with occasional hematuria, usually at the end of urination on attempting to squeeze out the last few drops. The family history was negative, except that the father died of kidney disease, the exact nature of which was unknown to the patient. The patient had the usual childhood diseases and enuresis until he was 10 years old. There were no other diseases. As long as he could remember he had had a painful bladder with pollakiuria. When 9 years old he had a slight urethral discharge and a bilateral inguinal adenitis, which lasted two months. The first distinct disability occurred when he was 14, at which time he had a severe pain in his back and an aggravation of his pollakiuria. The pain was dull and aching in character, continuous but increased by any exertion. It lasted three months, necessitating his giving up work. This pain has continued ever since in varying degree. In September, 1917, he enlisted in the Army and began treatment for his bladder condition by daily irrigation, which was continued for six months with little improvement. He was given a medical discharge and continued treatment, with periods of relief, until he enlisted in the Navy. He was admitted to the hospital in December, 1919.

He was well-nourished and robust. His temperature was normal, his appetite good, and physical examination was negative, except for tenderness over both kidneys, especially the left. Urological examination showed a slightly edematous scrotum, a penile hypospadias opening 2 cm. proximal to the glans, a prostate slightly enlarged, firm, and tender. Cystoscopy showed the bladder capacity reduced to 200 c. c. There was no residual urine, and the vesical sphincter was normal. The mucosa showed the changes of a severe chronic cystitis. It was beefy red throughout, with irregular papillary thickening and occasional villous projections of fibrin and pus. The vascular markings were obliterated, and the entire mucosa had a velvety, edematous appearance. No distinct ulcerations could be seen at this time. The right ureteral orifice was normal; the left was edematous, and on inserting the catheter for a short distance ejaculated a cloudy urine with flocculent material and blood. Both ureters were catheterized; on the left side an obstruction was met 5 cm. from the opening which could not be passed by a catheter of any size, but was evidently not complete, because a flow of urine was obtained through the catheter. This flow was intermittent, there being a steady flow for about 30 seconds and then no urine for 3 or 4 minutes. Examination of the separate urines showed the right to be clear, with a few renal cells, an occasional hyaline cast, and a slight trace of albumin. Smears and cultures were negative. The left was cloudy, contained albumin in abundance, a few hyaline casts, and numerous pus and blood cells. Cultures showed staphylo-

coccus, colon bacillus, and an unidentified Gram-positive diphtheroid bacillus.

Phenolsulphonephthalein intravenously showed a delayed appearance on the left side. The percentage of excretion for 15 minutes, as estimated by the Duboscq colorimeter, was too small to register. On the right it was 26.6 per cent for 15 minutes. Pyelography showed the right pelvis to be normal. On the left there was a saccular dilatation in the lower pelvic spindle, with a constriction beyond this and a markedly dilated ureter. (Plate I.)

To sum up, the examination showed a severe chronic cystitis and on the left side a stricture of the ureter 5 cm. from the ureterovesical opening, pyuria and bacteriuria, and nephritis with greatly reduced kidney function. Inoculation of guinea pigs proved the left kidney and bladder urine positive for tubercle bacilli. The right kidney urine was negative. Subsequent cystoscopy showed a progressive lesion at the left ureteral opening with the typical golf-hole ulceration.

A left nephrectomy was performed through a lumbar incision. Because of shock from loss of blood the ureter was left with the intention of removing it at a secondary operation. The kidney was markedly enlarged and showed four saccular dilatations or pouches on the lateral surfaces which on section proved to be abscesses containing pus and thick cheesy debris. The lining membrane of these pouches was thick and indurated. The upper and lower poles were studded with tubercles. (Plates II and III.)

Four months after operation the patient is up and about, is robust, and has gained 15 pounds since getting out of bed. He voids 4 or 5 times a day and has no nycturia. He has no pain at any time and there is a clearing up of his cystitis. There is an indentation that is not patent at the site of his left ureteral opening, but no ulceration. Bladder mucosa shows a return to normal with reappearance of the vascular markings. In the fundal zone there are several ulcers that are healing. He has no complaints and is considered cured. No attempt will be made to remove the ureter since it has probably undergone fibrous degeneration.

CASE 2. ACUTE METASTATIC PYELITIS.

—, Lieutenant, aged 30. On admission he complained of pain on deep pressure over the right iliac fossa, more marked in the lumbar region just above the right iliac crest. The pain was dull and aching in character and did not radiate except when he was in the upright position, when it was transmitted to the right groin and testicle. The history of previous illness was negative except for appendicitis in 1911, which was followed by operation and uneventful recovery.

At midnight, 12 hours before admission, while on the bridge of his ship, he was seized with severe pain in the lower right abdominal quadrant and vomiting. He had had a normal bowel movement just prior to the onset of pain. On admission to the hospital his temperature was 101, pulse 92, respiration 20. There was no dysuria. He did not look acutely ill. The abdomen was slightly spastic over the right rectus and tender only on deep pressure over the lower quadrant. Pressure over the abdomen caused severe pain in the right flank. There was a small fluctuating abscess just to the right of the umbilicus, which had been present for four days before the pain began. It had been opened, but still contained pus. There was no abdominal distention. Rectal examination was negative. The blood count showed 19,000 leukocytes with 85 per cent polymorphonuclears. The urine showed a few pus cells and red blood cells, no albumin.

Cystoscopy showed the bladder to be normal. A number 6 X-ray catheter was passed to the kidney on the left side. On the right side there was obstruction to the catheter 15 cm. from the ureterovesical opening. Repeated attempts to get the catheter past this level failed. There was free urinary flow on the left side. Laboratory examination of this urine was negative. A roentgenogram was taken with the X-ray catheter in situ. It showed nothing at or above the level of the obstruction. A plate, taken after injection of thorium through the right catheter, showed that the fluid did not progress above the level of the tip of the catheter.

Palliative treatment was given in the hope that a soft stone, casting no shadow, was causing the obstruction, and that as a result of manipulation and the injection of thorium it might be passed. The abscess on the abdominal wall was opened and one-half ounce of thick pus evacuated. Smear and culture of this pus showed *Staphylococcus aureus*. The urine passed in the next 24 hours was 720 c. c. The temperature varied between 99 and 100.5. The pain and soreness persisted and he had a feeling of distention in the lumbar region.

Since there was no improvement after 24 hours he was again cystoscoped and the right ureter catheterized, a stiff No. 6 olivary-tipped catheter being used. Resistance was again met at 15 cm., but was easily overcome. Immediately there was a steady flow of thick turbid urine containing old blood and debris. It flowed in a steady stream until three test tubes were filled. Examination of this urine showed a heavy cloud of albumin, abundance of pus cells, and red blood cells, and a few casts. A stained smear and culture showed *Staphylococcus aureus*. Following the catheterization the patient felt great relief and his pain disappeared, leaving only a slight sore-

ness. The catheter was left in the right ureter for drainage and removed 48 hours later. The pelvic capacity was found to be 25 c. c. and the pyelogram showed dilatation of the pelvis and calices. The temperature subsided to normal, and on the day following cystoscopy patient had no complaints.

The interesting feature of this case is the etiology of his unilateral pyelitis. He was robust and well nourished with no chronic foci of infection. The organism identified by smear and obtained in pure culture was the *Staphylococcus aureus* instead of the usual colon bacillus. The smear and culture of his abdominal abscess showed the same organism. This abscess appeared four days prior to the onset of his pyelitis and was undoubtedly the focus of infection. By way of digression it might be said here that the number of contaminations in culturing urine from separate kidney has been so great, despite careful technic in catheterization, that a greater dependence is placed on the stained smear of the centrifuged specimen. The cultures are used for checking and confirmation. In regard to the mechanism and accessory cause of infection in this case, the following theories of infection are paraphrased from Keyes (Cabot's Urology, vol. 2, p. 441, Lea and Febiger, 1918): All bacteria are transmissible through the kidney without permanent injury to that organ. They may be recovered from the urine by smear or culture. An overwhelming dose of bacteria may produce inflammation or, more commonly, accessory causes exist which are the determining factors. A common accessory cause is retention from obstruction. Ureteral obstruction is usually unilateral. It may be due to stone, blood clot, stricture or angulation of the ureter, nephroptosis, or traction from adhesions, or tumor, or to pressure from without. Ureteral obstruction may be so slight as to cause a retention of urine very slight in quantity or intermittent in quality. Such retention, though it be so slight or so intermittent as to elude the most careful observation, may nevertheless so congest the kidney as to occasion infection from circulating bacteria that would otherwise do no harm.

In the light of the foregoing it is not too much to state that in this case a slight obstruction or angulation exists in the right ureter 15 cm. from the ureteral opening that may be the result of adhesions from the old appendicitis. This is borne out by the pelvic dilatation and conformation of the calices, showing a certain amount of chronic obstruction. On the occurrence of a bacteriuria the right kidney and renal pelvis, on account of this accessory factor, became a field for activity for the circulating organisms.

After drainage and urinary antisepsis and healing of the abscess the patient made an uneventful recovery.

CASE 3. BILATERAL PYELITIS AND HYDRONEPHROSIS.

—, Ensign, aged 31. On admission he complained of pain over the bladder and in the lumbar region, increased frequency of urination and nycturia. The pain was dull and aching in character with discomfort and uneasiness in the pelvic region. The family history was negative. The previous illnesses were scarlet fever, measles, and pneumonia in childhood and gonorrhea in 1911. The last named was an uncomplicated attack lasting seven weeks.

In February, 1917, he had pain in the bladder region and in his back. The onset was gradual and accompanied by nycturia with increased frequency during the day. He was treated by a civilian physician for one month for cystitis. He was then cystoscoped and told he was suffering from a mild right-sided pyelitis, which was treated by weekly lavage with silver nitrate solution. No mention was made of the lesion on the left side. In December, 1919, he had an exacerbation of his trouble and was sent to the hospital.

Physical examination was negative except for tenderness over both kidney regions on deep palpation. The Wassermann was negative. The urine showed albumin, casts, red cells, and abundance of pus cells. The blood count showed 15,000 leucocytes with 70 per cent polymorphonuclears. Cystoscopy revealed a severe chronic cystitis. There was a bullous edema of the entire base which obliterated all trigonal markings and boundaries. The ureteral openings were obscured in the general inflammatory process. The process extended into the posterior urethra, and palpation and massage revealed a chronic prostatitis. Ureteral catheterization showed on the right side a free flow of turbid, flaky urine positive for albumin; red cells, pus cells in abundance, and pus casts. On the left side there was no flow for 20 minutes, then a free flow of fairly clear urine, positive for albumin, red blood cells, a few pus cells, and renal cells. Intravenous injection of phenolsulphonephthalein was followed on the right side by appearance after 5 minutes and 22 per cent excretion in one-half hour; on the left side by appearance after 20 minutes and 14.5 per cent excretion in one-half hour. The bacteriological findings were on the right side, colon bacillus, *Staphylococcus aureus*, *Sarcina lutea*. On the left side *Staphylococcus aureus* and colon bacillus. Pyelography showed on the right a slight dilatation and distortion of the calices with a capacity of 15 c. c.; on the left a marked dilatation and hydronephrosis with a capacity of 45 c. c. (See Plate IV.)

This illustrates the necessity of a complete examination in kidney lesions. After a recent examination he had been told that there was a mild pyelitis of the right side, while the foregoing functional tests and pyelography showed the left kidney to be the more seriously involved.

Weekly pelvic lavage with 1-500 silver nitrate solution and daily bladder irrigation gave marked improvement in the bladder symptoms. Frequency, urgency, and pain were diminished, but further examination showed progression of the lesion in the left kidney. The right kidney urine cleared up macroscopically and function was increased to 30 per cent in one-half hour. There was a slight increase in pelvic capacity. The left side gave a clean urine containing a few pus cells, but a marked diminution of kidney function; appearance was lengthened to 30 minutes with an 8 per cent output in the first half hour. The pelvic capacity increased to 58 c. c. (normal 6 to 10 c. c.), so that despite the symptomatic improvement the left pyelonephritis and hydronephrosis were progressive and not benefited by lavage and drainage. The cystitis showed some improvement, but edema was still marked.

The patient returned to duty with almost complete relief of his symptoms.

CASE 4. URETERAL CALCULUS.

—, Nurse, aged 32. The family history was negative. In 1915 she was operated on for chronic appendicitis and pyloric stenosis, followed by uneventful recovery. She had influenza one and one-half years ago and measles four months ago. Since that time she has not been well. Complained of lack of energy, but no urinary symptoms.

The onset was sudden. On the morning of April 4 she had an attack of nausea and vomiting, followed by pain in the left lumbar region. The pain was cramplike and radiated down the back and into the left groin and lasted three or four hours. It was not relieved by the vomiting, which was severe. The attack subsided and was followed by another later in the afternoon. These attacks persisted with varying intensity and duration until April 12, when she was referred to the urological service.

At this time she complained of pain, tenderness over the left lumbar region and the left kidney area anteriorly, increased frequency of urination with passing of small amounts, blurring of vision and diplopia. The physical examination was negative for any signs of uremia. The skin was moist without puffiness or edema. The eye grounds were negative for gross lesions. There was a small, high-tension pulse with blood pressure of 135 systolic and 110 diastolic. The abdomen was soft and flaccid with marked tenderness over the left kidney and left lumbar regions. There was a daily afternoon rise of temperature to 100 or 101. The white count was 19,400, with polymorphonuclears between 69 and 89 per cent. Routine urinalysis showed a clear urine with specific gravity of 1013, mod-

erate amount of albumin, hyaline and granular casts, and a few pus cells.

Cystoscopy showed the bladder negative except for a mild localized cystitis confined to the area of the trigone. This area showed bullous edema with a slight fibrinous exudate. Ureteral catheterization showed on the right side a free urinary flow with no obstruction to the catheter. Intravenous injection of phenolsulphonephthalein gave a slightly delayed appearance (eight minutes) and diminished secretion for 15 minutes (10 per cent). The urine was turbid and contained a small amount of albumin, a few pus cells, and casts but no bacteria. The pelvic capacity was normal and the roentgenogram showed a pelvis of normal size and outline. On the left side the catheter met an obstruction 6 cm. from the ureterovesical office. Attempts were made to pass this with a No. 7, No. 6, and finally a No. 5 catheter with a wire stylet. The latter succeeded but was not inserted to the pelvis on account of obstruction to its passage. The flow was retarded 30 minutes. Phenolphthalein appearance was delayed to 15 minutes and reduced to less than 5 per cent for 15 minutes. The urine contained a heavy cloud of albumin, pus, blood, and casts. The smears and cultures showed *Bacillus coli*, a staphylococcus, and a diphtheroid. About 6 c. c. of thorium were injected and the roentgenogram (Plate V) showed a dilated ureter at about the point of obstruction and two small stones at this point. The shadows were not very dense but were present in all plates. The patient was not operated on immediately because of the low position of the stone, the fact that the catheter had passed the obstruction, and the hope that manipulation would facilitate its passage.

An interesting feature was the high degree of oliguria, at times approaching an anuria. The amount secreted in 24 hours for 5 successive days was 150, 270, 285, 60, 290 c. c., with an average daily intake of over 1,500 c. c. of water. This was evidently due to the reflex diminution of function of the unobstructed kidney. Unilateral obstruction rarely produces reflex diminution in function in the opposite kidney when it is sound, but in this case catheterization showed the existence of a chronic nephritis in the right kidney which predisposed it to reflex disturbance. There was absence of any symptoms of uremia. The nonprotein nitrogen of the blood was 21 mg. per 100 c. c., which is normal. The blood sugar was 0.075 per cent, total urinary nitrogen was 9.24 grams per 1,000 c. c. After 5 days' delay with no progress of the stone and the period of tolerance of oliguria approaching a limit, the patient was operated on.

The pelvic portion of the ureter was approached extraperitoneally by Gibson's incision. The ureter was incised at the lowest accessible

point and a probe was inserted. This revealed a small irregular stone 5 cm. below the incision that could not be moved either way by the finger or probe, but was finally dislodged by a small forceps. The incision in the ureter was closed by a whipped stitch of plain gut through the outer coat and the abdominal wound closed over a cigarette drain. The patient had a stormy convalescence. A uretero-abdominal fistula was established, but on account of the distance of the two openings and the tortuosity of the path, drainage was not free and infection resulted. There were periods of absorption with toxemia, fever, delirium, cyanosis, nausea, and vomiting. On May 16 an opening was made through the old incision down to the pelvic brim, care being taken not to injure the peritoneum. About 500 c. c. of pus and urine were evacuated from a retroperitoneal lumbar abscess. Urine and pus drained freely and the patient improved rapidly until June 16, by which time the fistula had closed. The patient was up and about and had no complaint except occasional headache and insomnia.

Final examination shows normal red and white cell count, urine excretion averages 1,000 c. c. in 24 hours. It shows a trace of albumin, numerous pus cells and a few casts. The nonprotein nitrogen of the blood is normal. Ambard's ureosecretory coefficient is normal. Cystoscopy shows a peristaltic wave of normal interval in the intramural portion of the left ureter. There is an impassible stricture at the former site of the stone. It is doubtful whether the ureter is intact, because of the large incision and the trauma necessary to remove the stone and the duration of the resulting fistula and infection, but a flow was obtained through a catheter which was inserted for about 6 cm. Phenolsulphonephthalein was injected and appeared in five minutes and gave an excretion of 10 per cent in 15 minutes. The supposition that from the obstruction and infection the left kidney would lose its function and undergo atrophy and autonephrectomy has been abandoned in the light of these findings.

Name, T., H. W. Rate, E1-R. Ship or station, U. S. S. *Birmingham*. Single.

Diagnosis.	Mark present lesions by +	If history, give date.	
Primary.....	Scar.....	Nov. 19, 1919.	<i>Date exposure.</i> —Nov. 1st, 1919. <i>Place.</i> —San Francisco, Calif. <i>Prophylaxis.</i> —Yes. <i>Time after exposure.</i> —5 hours. 18 days' incubation.
Secondary.....			
Tertiary.....			
Latent.....			
Congenital.....			
Nervous.....			
Doubtful.....			
Cured.....			

Previous treatment.—Nov., 1919. One injection weekly of 0.6 gm. arsphenamine for 6 weeks; 9 injections salicylate of mercury 0.065 gm. Has had weekly injection 0.065 gm. mercury salicylate since that time.

Present symptoms.—Admitted to hospital with influenza. Has had no complaints except slight irritability and nervousness.

PHYSICAL EXAMINATION.

Genitalia.—Scar on prepuce.

Mouth.—Negative.

Eyes.—Conjunctivitis and blepharitis.

C. N. S.—Slight exaggeration of tendon reflexes; otherwise normal.

Vascular.—Negative.

Skin and M. M.—Negative.

Glands.—General adenopathy.

Smear. Stain.—No open lesions. Dark field.	Date.	CONCOMITANT DISEASES
		Has just recovered from influenza.

Urinalysis.—Amber; specific gravity 1.018; reaction acid; sugar; albumin negative amorphous urates; cylindroids.

FIG. 1.—Syphilitic record.

17908—20—3

4/25:	5/25:
1. Turbid; shreds.	1. Hazy; shreds.
2. Turbid; shreds.	2. Hazy; shreds.
3. Turbid.	3. Clear.
4/28:	5/30:
1. Turbid; shreds.	1. Hazy; shreds.
2. Turbid.	2. Hazy; shreds.
3. Turbid.	3. Clear.
5/3:	6/5:
1. Very slightly turbid.	Instillation 4 per cent AGNO ₃ to pos-
2. Very slightly turbid.	terior urethra, Keyes Ultzman.
3. Massage; turbid.	6/8:
5/7:	1. Clear; shreds.
1. Very slightly turbid.	2. Clear; shreds.
2. Very slightly turbid.	3. Clear.
3. Slightly turbid.	6/15:
5/10:	1. Clear; few shreds.
1. Very slightly turbid.	2. Clear.
2. Very slightly turbid.	3. Very slightly turbid. (Prostatic
3. Very slightly turbid.	secretion, no pus.)
5/15:	6/20:
1. Very slightly turbid; shreds.	1. Clear.
2. Very slightly turbid; shreds.	2. Clear.
3. Very slightly turbid; shreds.	3. Clear.
5/20:	6/27:
1. Very slightly turbid.	1. Clear.
2. Very slightly turbid.	2. Clear.
3. Slightly turbid.	3. Clear.
	To duty.

REMARKS.

5/25. Prostate regular in outline, slightly boggy. Vesicle, no change.
 5/25, Cystoscopy: Buerger systo-urethroscope shows hypertrophic urethritis
 uretho-cystic condition of verumontanum.

FIG. 4.—Gonorrheal record (reverse).

CYSTOSCOPY.

Nurse. Age, 32. S. O. Q., 4/12/20.

Bladder.—Capacity, 450 c. c.; residual urine, none.

Internal meatus.—Prostate. Sphincter, normal.

Trigone.—Marked congestion and bullous edema. Small amount of fibrinous exudate.

Gross appearance.—Entire basal zone same pathology as noted above.

Tumors and foreign bodies.—None.

Ureteral orifices.—Slight redness and edema about left; right normal.

FIG. 5.—Cystoscopy record.

	Right.	Left.
Obstruction.....	None.....	6 cm from urethral orifice.
Flow.....	Free.....	None for 30 minutes.
Pthalein total.....	32 per cent.....	First hour.
First appearance.....	8 minutes.....	15 minutes.
Per cent 15 minutes.....	10 per cent.....	Less than 5 per cent.
Per cent second hour.....		
Amount.....	30 c. c.....	30 c. c.
S. P. G.....	1032.....	1030.
Transparency.....	Turbid.....	Clear.
Reaction.....	Acid.....	Acid.
Albumin.....	Heavy cloud.....	Heavy cloud.
Pus.....	2-4 to field.....	10-15 to field.
Blood.....	Abundant (catheteri- zation.)	Moderate amount.
Casts.....	Occasional hyaline...	Hyaline and granular.
Cells.....	Few renal.....	Many epithelial.
Bacteria.....	Negative.....	Bacillus coli, staphylococcus aureus, diphtheroid.
Inoculation guinea pig	$\frac{5}{2}$ negative.....	$\frac{5}{2}$ negative.
Pyelography capacity.	$7\frac{1}{2}$ c. c.....	Not injected; about 8 c. c. filled a dilated ureter be- yond point of obstruction 6 cm. from uretero-vesical opening. Two small stones demonstrated at this point.
Roentgenogram.....	Normal pelvic outline.	

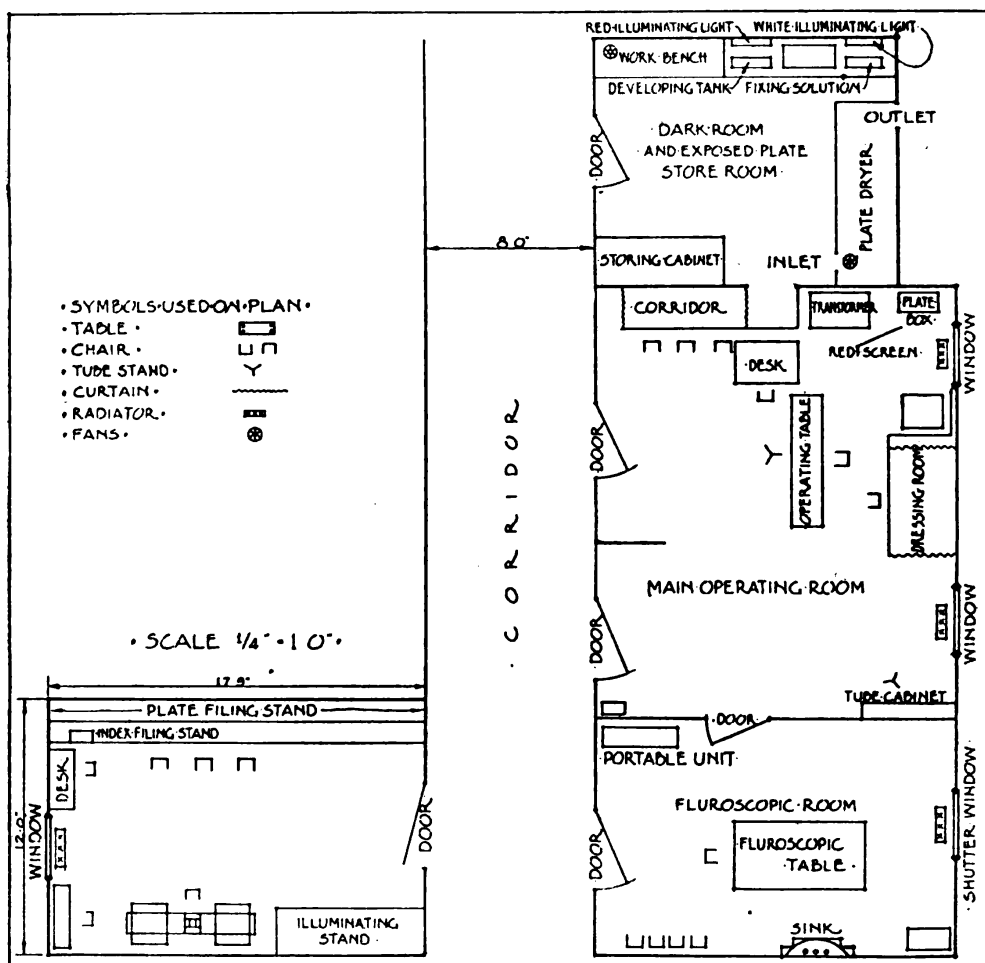
FIG. 6.—Cystoscopy record (reverse).

THE ROENTGENOLOGICAL SERVICE.

By H. R. COLEMAN, Lieutenant, Medical Corps, United States Navy.

The X-ray laboratory at this hospital is the only one in operation at Mare Island, consequently a very considerable amount of our work is that referred from other sick bays and ships attached to the yard. Most of these cases are caused by accidents among yard workmen and are referred by the yard dispensary.

The laboratory comprises four rooms, three of which are adjoining on the same side of the corridor and might properly be called



the operating rooms. The fourth is directly across the corridor and is used as a record and file room. It serves also as a waiting room for patients, and houses our direct and stereoscopic illuminating boxes.

Upon admission to the waiting room, an N. M. S. Hospital Form No. 6 is made out for every patient, from the date taken from his request blank. Each patient is then assigned a serial number, admitted in his turn to the main operating room where the remainder





Lateral view of spine shown with double screen technique; distance, 5 feet.

of N. M. S. Hospital Form No. 6 is made out, and roentgenograms made as per request. His name is written on the outer jacket of each exposed plate. N. M. S. Hospital Form No. 6 is filed and the patient released.

Our operating room houses one Scheidel-Western transformer, two Kelly-Koett tube stands, operating table, tube cabinet, desk and file, accessory cones, sandbags, etc., and ladies' dressing room.

The dark room adjoins the operating room on the left and is reached by a leaded maze. It houses our unexposed plates and films, chemicals, photographic supplies, rack holders, red and white illuminating boxes, large plate-washing tank with 5-gallon solution tanks immersed at each end, and a plate-drying cabinet. The immersion of developer and fixer tanks in the large plate-washing tank enables us to regulate and stabilize the temperature of our solutions.

The drying cabinet is air-tight, except for two openings. There is a 16-inch electric fan at one end behind which is an intake opening in the base of the cabinet, 8 inches square, through which air is drawn. This air is forced over the racked plates and expelled through a similar opening built through the outer wall of the dark room. Thus we have both plate dryer and ventilator combined. Our dark room is always dry, filled with fresh air, and the musty stuffiness so often encountered in dark rooms is done away with.

As soon as plates are exposed they are taken into the dark room, removed from their jacket, the name on the jacket is copied on the emulsion side of the plate with wax pencil, it is fitted into plate holder, developed, washed, fixed, and then rewashed, and, after two hours in the water bath, transferred to the drying cabinet. The following morning they are removed from the holders and taken to the reading room, along with their corresponding N. M. S. Hospital Form No. 6 cards taken from operating-room file. The plates are diagnosed, the diagnosis and reading entered on the back of the N. M. S. Hospital Form No. 6 cards. The plates are then filed by serial number, and the N. M. S. Hospital Form No. 6 cards filed alphabetically.

The fluoroscopic room adjoins the main operating room on the right. It is painted orange color and is fitted with complete window shutters. It contains a Bush adjustable fluoroscopic table and our portable X-ray unit. We are using a 10 M. A. radiator tube in our fluoroscopic box, running it from our portable unit, using 6 M. A. with a 5-inch spark gap. It is giving excellent results.

The medical wards at this hospital are about a hundred yards from the main building. The original wheels of the portable were too small to make this long move practical, so they were removed and the portable mounted on a chassis using the large wheels of surveyed

wheel chairs. This change has proved very satisfactory, as it permits of easy transport of unit.

From January 1 to July 1, 1920, 1,855 patients passed through the X-ray room. Some required only 1 plate and some have as high as 15 plates in their filing jacket. Of these 916 were referred from the hospital; 390 from the yard dispensary; 235 from marine barracks; 237 from the naval training station and receiving ship, and 77 were yard personnel.

Of the total number of patients, 349 were referred for chest examinations; 823 were for investigation of bony injury or pathology. Teeth films and plates were asked for on 578 patients; 78 patients were plated for soft tissue diagnosis, and 47 gastrointestinal series were run.

Unaccounted for in these figures were those patients who were fluoroscoped for foreign bodies. We also ran routine fluoroscopic examinations on convalescent empyema cases to determine the extent of drainage, aeration, and expansion of lung fields. The 916 patients referred by the hospital were made up of the usual type of hospital work, including practically all the chest examinations and gastrointestinal series.

The 390 patients referred by the yard dispensary were mostly for questionable injuries to the bones of the extremities which one would expect to occur from industrial accidents, while those from the marine barracks and naval training camp were mostly teeth plates.

A large percentage of the 349 chest plates were made for pathology following influenza, pneumonia, and empyema. As a routine proceeding stereoscopic roentgenograms were made of all chests. A study of these in conjunction with clinical history and findings is very interesting. The plates of convalescent influenza cases often show all the infiltration and markings of an active tuberculosis, yet these patients go on to complete recovery, giving negative tuberculin tests. Subsequent plates show the lung fields negative except for exaggerated bronchial shadows and fibrosis. Interlobular pleural thickening was a rather common finding among the post-influenzal roentgenograms. Another interesting study was the empyema series. Some of the more marked cases of pleural thickening cleared up almost completely soon after the discontinuance of drainage, while in others it persisted over a considerable period after drainage had ceased, and I feel certain that there was a definite relation between the convalescent time and the active drainage time, which might be stated as follows: The amount of pleural thickening and the resolution time vary directly with the length of the active drainage period regardless of the size of the cavity.

Nearly one-half, or 823, of our entire number of patients were referred with known bone pathology or in search of it. Injuries to

bones of the hand were the most common, followed closely by injuries to bones of the foot. Fractures of the extremities were about evenly divided. Anterior, posterior, and lateral plates were made in all cases. All skulls were plated (stereolateral) and single anterior posterior. In radiographing teeth we have made it a matter of routine to use plates on molars and bicuspid and films on all other teeth. We found that practically all root abscesses are at the base of improperly and incompletely filled root canals or in teeth where the nerve was devitalized.

Most of our series plated for soft tissue pathology were pyelograms. A 2 per cent thorium solution or 25 per cent potassium iodide solution was used in injecting the ureters and kidneys. The potassium iodide gave the best-defined shadow, but in many cases produced severe shock and excruciating pain, which does not accompany the use of thorium solution. Our gastrointestinal series comprises 47 cases. The technique used is as follows: The patients reported for examination at 9.30 a. m., having had no breakfast and no cathartic. They were given a barium meal, using buttermilk as a vehicle. Before the fluoroscope the esophagus was examined during ingestion. The stomach was observed at intervals for 15 minutes, then a roentgenogram was made, using films with double-screen technique six hours later, during which period no food was given; another fluoroscopic examination was made and another film taken. Twenty-four hours after ingestion of meal a third fluoroscopic examination and plate were made. Forty-eight hours after ingestion of meal the final fluoroscopic examination and plate were made. We found evidence of gastric ulcer in only two cases and no new growths. Examinations showed intestinal adhesions and immobility of the cecum to be a common occurrence, but we were unable to demonstrate any definite relation between the latter and chronic appendicitis. The outstanding feature was the marked variation in position of the stomach and transverse colon in different individuals, with very few relative symptoms. However, those suffering from marked ptosis of the large gut always gave a definite history of chronic constipation. The amplitude of peristalsis, the relative speed and progression of the meal, together with the emptying time, are believed to be the more important gastrointestinal roentgenological findings.

We have nothing new to offer in the way of technique, but we have made a few observations which might be of interest. Our work has a very wide range—one plate is a finger, the next is a hip. For such work we firmly believe in the Coolidge tube, and we find that the 30 M. A. radiator tube gives us the best bone detail, doubtless due to its extremely fine focus. We are using this tube for all work except chest and soft tissue plating and feel that our poor plates are not the

fault of the tube. In the chest and soft tissue work we are using the large Coolidge and gas tubes and believe we get a better diagnostic plate by using the higher milliamperage which they afford.

In taking sinuses we have been able to get a very fine plate of all accessory sinuses with a single exposure by having the patient put forehead and nose on the plate and then directing the focal ray through the glabella and superior border of the maxillary sinus in the median line plane. With the tube 10 inches from the patient such a plate is diagnostic for frontals, ethmoids, maxillaries, and mastoids; it gives also an excellent anterior posterior view of the rami of the mandible.

Recently we have been taking our lateral spine plates at a distance of 5 feet using double-screen technique. The plates have been very satisfactory.

In the localization of foreign bodies in the eye we are using Sweet's method as described in the U. S. Army X-ray Manual, and are satisfied with our results.

We have found that complete mobilization of the part to be radiographed is essential to the production of good plates and have made the sand-bagging of the part to be plated a routine measure. It takes more time and care, but we feel amply repaid for our trouble.

Form used for report of findings.

-----		(Name)	(Rate)	(Serial No.)
Age-----	Sex-----			
(Years)		(Referred by)		
Clinical diagnosis-----				
Roentgen diagnosis-----				
Surgical findings-----				
Date-----	hr-----	min-----	m.	Radiographer-----
Tube-----	Time-----	Screen-----	Dis-----	cm. Volts.
				m. a.-----
				Pen-----

N. M. S. Hospital Form No. 6.

A MODEL LABORATORY AT MARE ISLAND.

By G. A. GRAY, Lieutenant, Medical Corps, United States Navy.

While visiting a hospital one is almost always shown the clean, neatly kept wards, the white, spotless operating room with its modern equipment, the up-to-date sanitary kitchen, and the busy office. If you ask to see the laboratory you are invariably led along a dark passage or two and finally come upon a dull, dusty room usually in close proximity to a cold, formaldehyde-soaked morgue, and are told "here it is." As a result many a beginner in naval work has felt that he was not particularly anxious to specialize in laboratory work.

At the U. S. Naval Hospital, Mare Island, Calif., they proudly boast of one of the finest laboratory units in the service. The designer seemed always to have kept foremost in his mind that this building was to be the home of the technicians, and that pleasant surroundings here would mean more efficient results. To reach this end he has produced a large, clean, splendidly lighted and ventilated, single-story wooden building, 110 by 29 feet. The walls of the structure are 15 feet from the floors and the roof rises to a height of 23 feet at its central ridge. Externally it is painted in a fawn color with white trimmings; internally it is in natural-wood colors heavily varnished. There are 47 standard-sized windows 8 by 2½ feet, three doors containing windows, and large ventilating windows 2 by 4 feet in the apex near the roof at each end of the building. The structure is placed with its main or north side facing along a concrete roadway and with its southern side on the bank of a small ravine moderately shaded by large eucalyptus trees about 40 yards from the main hospital building. Both ends lying east and west have an unobstructed approach, save for a low two-room cottage, the morgue, surrounded by flowers and shrubs, about 25 feet from the east doorway. A small steel building at the west end is used to house the gas machine. The grounds about the unit have been beautified by the landscape gardener and bear out the general, well-kept appearance of the entire hospital compound.

The main entrance with its artistic porch and covering is situated in the middle of the north side of the building along the roadway. The other doorways at the east and west ends of the laboratory are for the convenience of the staff only. Upon entering the main doorway one steps into the receiving room or reception hall, a space about 20 by 15 feet, lighted by two standard-sized windows. Along the walls of this room are placed the steel filing cabinets containing the laboratory files and records, kept on standard 6 by 4-inch filing cards. In the center of the room is placed a desk where the hospital corpsman on watch receives and receipts for, by means of a time stamp, all specimens and requests brought to the laboratory. The requests or specimens are then delivered by the man on duty at the receiving desk to the particular technician performing that work, so that any urgent test is immediately taken care of. After the hours of receiving all routine work have passed, the man on watch attends to his regular duties and is called to the desk as occasion arises by means of a buzzer that sounds synchronously at both ends of the laboratory. Three or four chairs arranged along the walls here serve the purpose of a reception room when required.

From the receiving room open four doors and a corridor arranged as follows. In the northeast corner of the room is placed a door leading to the toilet. The door in the southeast corner opens into

the bacteriological room. The media room is entered through a door in the south wall, while a corridor about 3 feet wide and 32 feet long runs from the receiving room down the center of the building west to the chemical room. The fourth door which is situated near the north side of the room on the immediate right upon entrance into the building opens into the office of the laboratory officer.

The bacteriological room, the largest in the building, is 36 by 29 feet and occupies the entire east end of the laboratory. It is splendidly lighted and ventilated, having 18 windows, a doorway exit, and a large ventilating window near the roof. Two large tables 4 by 12 by 3½ feet high, with acid-proof surfaces, and containing roomy drawers and cupboards for various apparatus are arranged near the center of the room. A sink with hot and cold water faucets and drying rack above are installed at each end of the tables. A standard acid-proof working shelf 3 feet high and 26 inches wide, with conveniently arranged drawers and sinks, extends around three sides of the room, with a space for the exit doorway at the east end. To the left of the doorway as one enters from the reception room is placed a refrigerator, a filing cabinet for current monthly records, and a low-temperature incubator. To the right of the entrance stand two incubators and a centrifuge. Along the north side of the room, where the light is the best, all of the microscopical work is carried on. Shelves containing staining bottles, etc., are conveniently arranged on the walls between the windows. On the south side of the room the pathological section work, vaccine, animal inoculation, and serological work other than the Wassermann test, such as agglutination and typing, is conducted. The laboratory library occupies a series of shelves on the east wall of the room.

The media room is 14 by 26 feet and contains four windows. Its center is occupied by an acid-proof table 4 by 8 by 3½ feet similar to those in the bacteriological room. A working shelf also extends around two sides of the room. A large autoclave, a second smaller one, an inspissator, a hot-air drying oven, and a large refrigerator make up the rest of the floor apparatus in this room. A large 25-gallon bottle with siphon attachment containing the laboratory supply of distilled water is placed on a special stand here and is replenished from the hospital still as occasion demands.

The office, the remaining room adjoining the receiving room, is a space 11 by 11 feet containing two windows, a desk for the laboratory officer, as well as a desk and typewriter for a stenographer, a filing cabinet, shelf for current literature and books, and a washstand. Two other doors open from the office, one to the Wassermann room and the other to the corridor extending along the middle of the building from the receiving room to the chemical room.



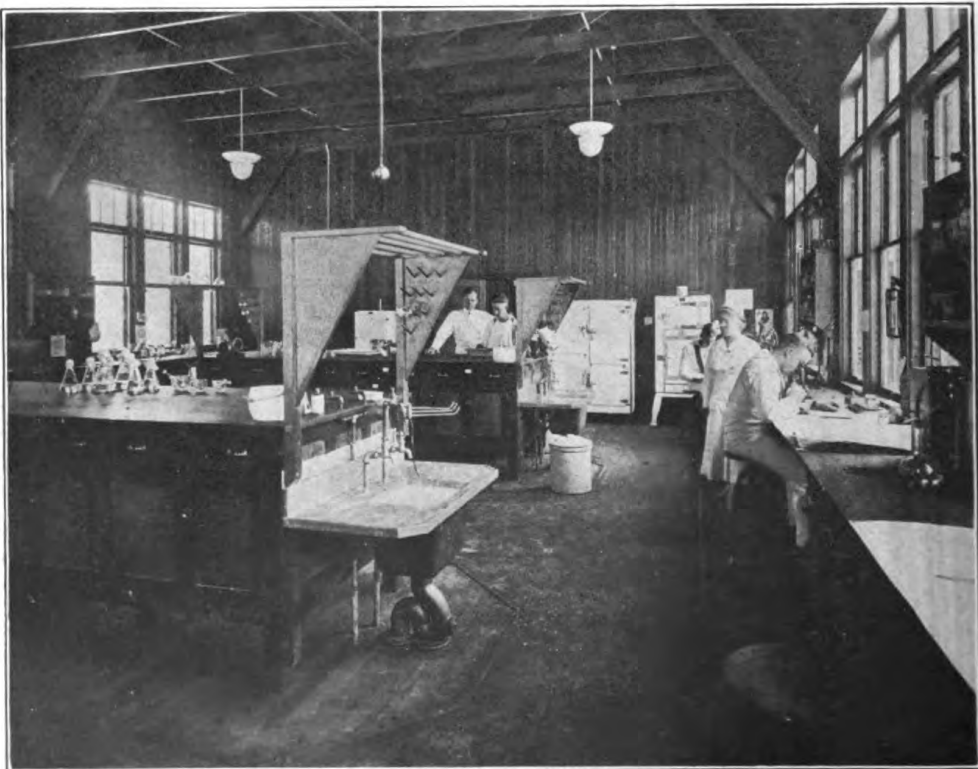
Entrance hall of the laboratory, U. S. Naval Hospital, Mare Island, Calif.



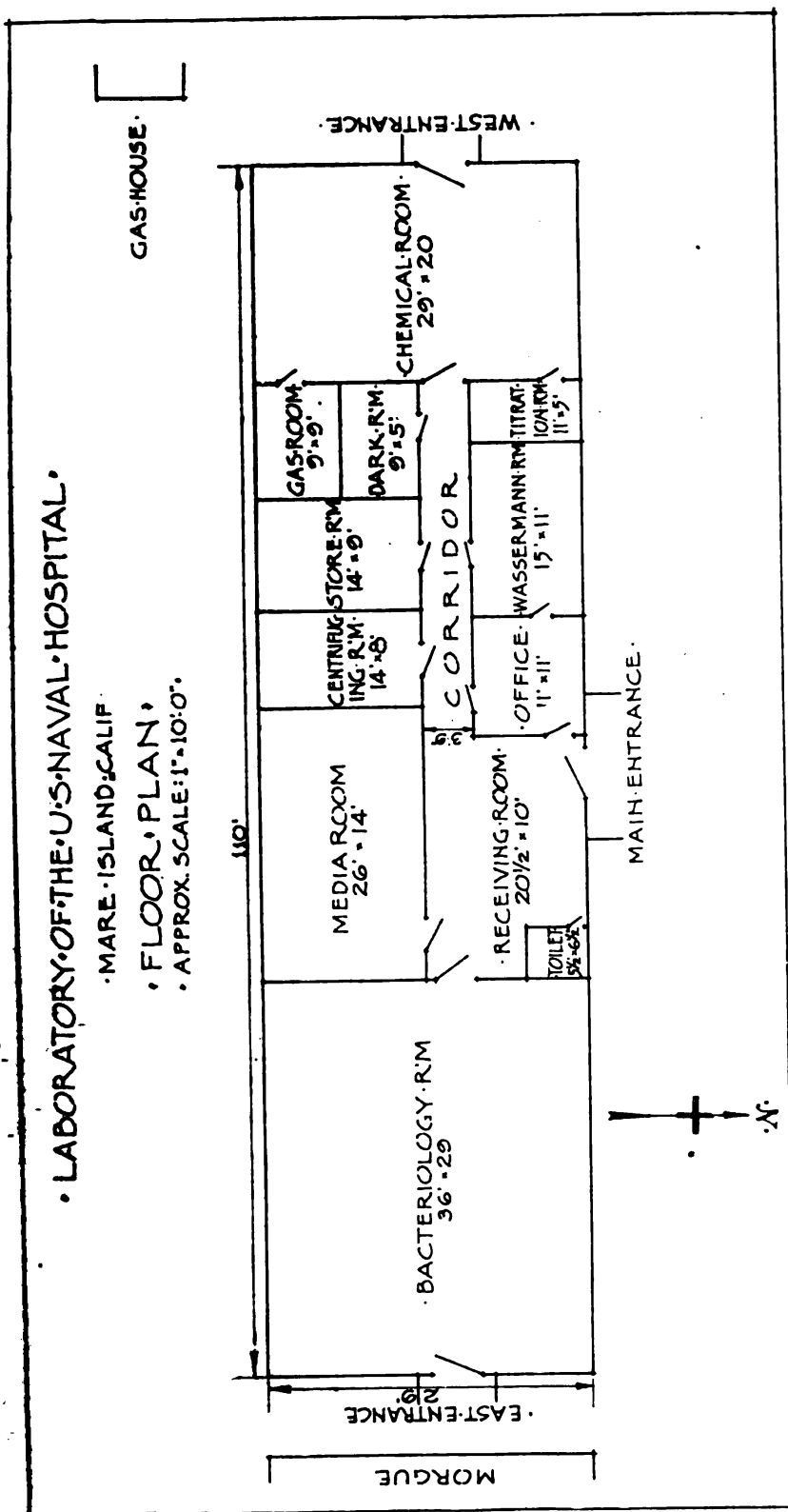
The laboratory, U. S. Naval Hospital, Mare Island, Calif.



Chemical department of laboratory, U. S. Naval Hospital, Mare Island, Calif.



The bacteriological department, laboratory of the U. S. Naval Hospital, Mare Island, Calif.



The Wassermann room occupies the rest of the building on the north side of the corridor east of the chemical room. It is 15 by 11 feet and has four windows with a working shelf along two walls of the room similar to the shelves in the other rooms described above. The shelf along the west wall of the room holds the electric sterilizer and electric water bath. The apparatus for the colloidal gold and complement fixation work is kept in a large cabinet along the south wall.

Across the hall from the Wassermann room and office is situated the centrifuging room, a space 14 by 8 feet, containing one window. Here is a large centrifuge as well as a shaking machine, each placed upon a separate concrete base extending from the ground up through the floor. A rack of cages is kept here in which are placed all inoculated animals that are expected to die within a short period of time, as in virulence and typing work.

Next to the centrifuging room is located the storeroom, which has two windows and is about 14 by 9 feet. It has rows of shelves along both the 14-foot sides and a stand containing double rows of shelves in the middle of the room.

The next door along the corridor on the south side opens into the dark-field room, 5 by 9 feet, with no windows. In this room along the west wall is placed a series of shelves that hold the reserve stationery of the laboratory. A desk with the necessary apparatus for conducting dark-field examinations stands along the east wall.

The west end of the corridor at this point now opens into the chemical room, which occupies the entire corresponding end of the laboratory that the bacteriological room does in the east end of the building. It is 29 by 20 feet and is well illuminated by ten windows, an exit door, and a ventilator in the apex near the roof. It has an acid-proofed working shelf around three sides of the room, with an opening allowed for the west exit doorway. The center has a table 15 by 5 by 3½ feet with sinks, etc., similar to those in the media and bacteriological rooms. At the left of the entrance from the corridor is placed a centrifuge for urinalysis, and in the corner near by, in the southeast part of the room, is a door leading into the gas room. The gas room is 6 by 8 feet and has two windows. Inside is a gas hood with electric furnaces and still for Kjeldahl and blood nitrogen work. A large chlorine tank is also placed in this room and is used in the preparation of Dakin solution. On a shelf over a sink is placed a Van Slyke apparatus for blood urea determinations. In the southwest corner of the chemical room on the working shelf is installed a small electric motor used for air suction and pumping. On the shelf near the west exit door is a Van Slyke apparatus for the determination of the CO₂ in the blood plasma. Spa-

cious shelves containing the chemicals required for routine work are arranged conveniently on the walls between the windows. In the northeast corner of the chemical room is a door, corresponding to the one leading into the gas room, which opens into the titration room. Here are arranged the various solutions with automatic filling burettes attached to containers, for use in all titration procedures. (See floor diagram.)

The entire building is floored with thick cork matting with brass stripping and has an artificial lighting system of direct illumination, toned with frosted globes. The gas house contains a gas machine, which supplies the laboratory burners and also serves as a storehouse for acids. The morgue has modern equipment and an extra room in which friends and relatives may view the bodies after they are prepared and placed in their caskets. The animal house containing the reserve animals and those inoculated with specimens for tuberculosis determination, etc., is situated across the ravine from the laboratory, a distance of about 50 yards.

The personnel of the laboratory at present consists of 2 medical officers, 3 nurses, 1 chief pharmacist's mate, 2 pharmacist's mates first class, 1 pharmacist's mate second class, 2 pharmacist's mates third class, and 3 hospital apprentices second class. One civilian employee is attached to the laboratory to sweep out daily and wash glassware. The laboratory can easily perform all routine and practical hospital tests required. A report of the work performed during the past month follows. Instruction classes for the hospital corpsmen in the hospital are conducted four days a week. This tends to acquaint all the hospital corpsmen on duty at the hospital with a few of the essential laboratory procedures. The classes are composed of 10 men each.

Monthly laboratory report, April, 1920.

Bacteriological department:

Nose and throat cultures.....	1,046
Diphtheria virulence tests.....	9
Animal inoculations other than above.....	16
Animal autopsies.....	18
Urine cultures.....	19
Pneumococcus typing.....	2
Smears for tubercle bacilli.....	91
Antiformin tests.....	5
Stools examined.....	7
Spinal fluids cultured.....	1
Bacterial counts.....	1
Miscellaneous smears and cultures.....	141
Blood cultures.....	2
Malarial smears.....	11
Autogenous vaccines.....	4

Chemical department:	
Urinalysis	706
Kidney function test.....	2
Quantitative sugar in urine.....	3
Blood sugar estimation	4
Blood urea.....	1
Nonprotein nitrogen of blood.....	4
Total nitrogen—Kjeldahl.....	2
Gastric analysis.....	3
Milk test, butter fat.....	5
Dakin solution prepared, gallons.....	100
Serological department:	
Spinal fluids examined.....	11
Blood counts—	
White	111
Red	13
Differential	29
Hemoglobin estimation.....	11
Pleural fluids examined.....	8
Blood transfusions	1
Blood typing for transfusions.....	4
Wassermann test—	
Blood	257
Spinal fluid	12
Lange's gold chloride test.....	6
Complement fixation test (gonococcus).....	1
Inoculations with—	
Horse serum	2
Acne vaccine.....	18
Diphtheria bacterine.....	36
Triple typhoid saline.....	42
Tuberculin O. T.....	7
Tuberculin Von Pirquet.....	5
Cowpox	12
1,000 units antitoxin.....	7
Toxin-antitoxin	9
Schick tests.....	90
Pathological department:	
Autopsies performed.....	5
Pathological sections made and examined.....	5

SOME FEATURES OF THE ORGANIZATION AT THE NAVAL HOSPITAL, MARE ISLAND, CALIF.

By E. C. WHITE, Commander, Medical Corps, United States Navy.

FIRST LIEUTENANT.

- Long ago it was found necessary to detail an officer as first lieutenant, or assistant to the executive officer, on our large ships. For the same reasons it was found necessary to detail an officer for similar duties at this hospital when the war caused its rapid expan-

sion. As the exigencies of the personnel permitted, this officer has sometimes been a medical officer and sometimes a pharmacist, but our experience has been similar to that on board ship in this respect for the pharmacist, like the boatswain, has not sufficient rank nor authority to carry out the duties effectively. It is advisable to detail to the position a medical officer of as high rank as possible. It is the policy here to change the officer so detailed every three or four months, as the detail is one not usually sought after because of the absence of professional duties and opportunities.

Our Hospital Organization Book describes the duties of the first lieutenant as follows:

"The first lieutenant shall be a junior medical officer selected by the executive surgeon. Except when the executive surgeon himself inspects, he shall make the regular daily executive surgeon's inspection as required by the Manual for the Medical Department. He shall be in charge of the outside master-at-arms' work, of all minor repairs, and of all fire apparatus and see that it is always ready for use."

The executive surgeon's routine includes one complete inspection per week of all wards and buildings on the hospital reservation in addition to accompanying the commanding officer on his weekly inspection, but it is very frequently difficult to carry out this routine at scheduled times. The first lieutenant, as the representative of the executive surgeon, makes regular daily inspections and reports the results to the executive surgeon. He notes all minor repairs needed and sends orders to the mechanics concerned.

His duties in charge of the outside master-at-arms work include checking over the ward reports to see that all convalescents available are put on general detail instead of being retained in the wards to perform minor duties, obtaining sufficient convalescents to serve as messmen, and seeing to it that others are ready to replace them as their ranks are depleted by the duty-party list.

Listed as of the first importance among the first lieutenant's duties in this hospital of frame construction are those of fire apparatus chief. Our fire protection includes salt-water fire plugs, reels of hose, small chemical handcarts, fire extinguishers, and fire ladders on the outside; numerous reels of small-caliber hose on fresh-water connections, three chemical carts in the main building, fire extinguishers, pyrenes, and fire axes on the inside. At least once a month he checks it over to be assured that the plugs are not clogged with mud, that all spanners are in place, ladders properly rigged, axes where they belong, hose in good condition, chemical carts and fire extinguishers in place and properly filled. At one time a great many pyrenes were placed in all buildings and wards, but some of the

patients discovered that there was a ready market for them among the automobilists of Vallejo, others that the pyrene fluid would remove paint and stains from uniforms, and still others that they made excellent squirt guns for use in water fights after the lights were out.

CHIEFS OF SERVICES.

The chiefs of medicine and surgery are the two officers next in rank to the executive surgeon. The paragraphs in the organization referring to their duties read as follows:

"The surgical work is in charge of the chief surgical officer and includes surgery; eye, ear, nose and throat; all operating and dressing rooms; all surgical records; X-ray and electrotherapeutic departments; dental department. The chief surgical officer has charge of surgical officer-patients and may use such of his assistants in these cases as he may deem necessary. All surgical work is to be referred to him when he is available, whether on duty or not. He will assign the operative work and see that all junior medical officers obtain practical experience.

"The medical work is in charge of the chief medical officer and includes general medicine, contagious, psychopathic and venereal wards; the laboratory; all medical records; the morgue; and the hydrotherapy room. The chief medical officer has charge of officer-patients, medical."

The venereal wards are placed under the chief of medicine as a matter of convenience, as they are in one of the new units adjacent to the medical wards, while the surgical wards are in the main hospital building.

The chiefs of services consult with their junior officers in all serious cases and keep informed as to the progress and treatment of all important cases. They inspect and initial all health records and papers for filing in the hospital records before the patients are discharged to duty. Once a week each chief inspects the health records of all patients in all his wards and makes a written report to the commanding officer as to whether all health records are written up to date or not and as to whether any are missing.

OFFICER OF THE DAY AND SUPERVISOR.

In this hospital, as in others of our larger hospitals, it was found that the work was too much for a single officer of the day; and, there being sufficient medical officers attached to the hospital, two officers of the day were put on duty. At first they were known as the senior and junior officer of the day, and they had their offices in different buildings and each kept a journal. Later, when the number of patients and medical officers decreased, and it was seen that many occasions might arise where it would be difficult to fix the responsi-

bility on the proper officer, this system was changed. The senior officer on duty is now known as the supervisor and the junior as the officer of the day. The supervisor inspects certain parts of the hospital, holds evening sick call in half of the wards, and sleeps in one of the rooms set aside for the officer of the day. But the officer of the day keeps the medical journal, remains at the officer of the day's desk, except when called away on duty, and is responsible for everything that occurs during his tour of duty. If he is to be absent from his office for any considerable period of time, the supervisor takes the desk and writes up the journal as officer of the day for the time he is at the desk. Except at such times, the supervisor bears the relation of advisor or consultant to the officer of the day. He must remain on the hospital reservation and keep the officer of the day informed as to his whereabouts, but is otherwise unrestricted.

The relief officer of the day is a third officer on duty. His only regular duty is to attend all funerals. He is always available to relieve the officer of the day in case both the officer of the day and the supervisor are otherwise engaged.

THE WELFARE NURSE.

The position of welfare nurse was created in July, 1917. Miss Julia T. Coonan, Nurse Corps, U. S. Navy, was assigned to the position at that time and still continues to carry out its duties with remarkable efficiency and satisfaction, both to patients and to the hospital administration. Her work has been invaluable, particularly during the two epidemics of influenza, and a blessing to the sick and their relatives alike.

Her duties include those carried out in some of our hospitals by a nurse detailed by the American Red Cross. Upon the completion of the Red Cross House she was given an office in it and she is the connecting link between the hospital and the Red Cross.

Her duties are numerous and varied, all having to do with the comfort and relief of mental anxiety in the patients and their relatives. She makes a daily tour of all wards and visits all bed patients, giving them a word of cheer, inquiring as to their wants and carrying them out if possible. These wants include: Writing letters home, locating stray belongings, seeing the paymaster about their accounts, collecting money and valuables and depositing them with the paymaster, sending for stamps and money orders, supplying Red Cross stationery and magazines, investigating matters concerning Government insurance and allotments, arranging to alleviate family distress through various Red Cross chapters, etc. Ward medical officers inform her as to who are seriously ill and keep her informed daily as to the condition of patients. To the next of kin

of all such patients she sends a daily telegram, keeping them informed as to their progress. Upon the arrival from a distance of relatives of the seriously ill she welcomes them and, if necessary, has them put up in rooms set aside for that purpose in the Red Cross House. In case of death it is she who renders what aid and extends what comfort it is possible to give to the bereaved parents.

Through her the hospital keeps in touch with the chaplains on duty in the navy yard, they keeping her constantly informed as to their whereabouts. At 2 p. m. daily a list of all cases to be operated on the next morning, with their religion, is sent to the welfare nurse. She notifies the Catholic chaplain in the case of all Catholics who are to be given a general anesthetic, as the Catholic chaplain considers it obligatory that they see him before taking an anesthetic. In the cases of Protestants and Jews she asks them all if they desire to see a chaplain before being operated on.

The work of the welfare nurse is of the greatest importance, even when considered only from the standpoint of treatment of the patients' disease. Patients, feeling that there is some one vitally interested, not only in their getting well but in all their petty troubles and worries and in those of their families, lend cheerful and willing assistance to the efforts of their doctors, nurses, and hospital corpsmen.

HANDLING OF BAGS AND OTHER PERSONAL PROPERTY OF PATIENTS.

A. IN THE WARDS.

The following articles only will be kept by patients in their lockers:

BLUEJACKETS.	MARINES.
1 suit of blue or white.	1 suit of blue, khaki, or forest green.
2 suits of underclothing.	2 suits underclothing.
3 socks, pair.	3 socks, pair.
1 white hat.	2 shirts.
1 blue hat.	1 blue cap.
1 neckerchief.	3 towels.
3 towels.	1 shoes, pair.
1 shoes, pair.	Toilet articles.
Toilet articles.	

All other personal property must be stored in the bag room.

Upon the arrival of a very sick patient in the ward all his valuables are collected by the nurse, inventoried, and placed in a sealed envelope. Ambulant patients able to look out for their valuables are encouraged to turn them in but not compelled to do so. The ward nurse turns over all envelopes to the welfare nurse, who in turn deposits them with the paymaster and obtains a paymaster's receipt.

for them, which she gives to the patient. If bed patients desire the return of any money or other valuables on deposit with the paymaster they inform the welfare nurse at her morning visit. After completing her round of the wards she visits the pay office and obtains the valuables for all who desire their return.

B. IN THE BAGROOM.

The ambulance driver makes a list of all bags, suit cases, hammocks, etc., in a book at the time of their receipt. Upon arrival at the hospital he delivers them to the proper bagroom and the bagroom keeper signs in his book for every single item received. If it is late at night the master-at-arms on duty receives, signs for, and places them in the bagroom. But the ambulance driver is held personally responsible until he has a receipt in his book signed by some one authorized to receive baggage.

The first thing every morning the bagroom keeper empties all unlocked bags received the day before and checks their contents against the lists on the hospital tickets. Articles in excess are entered on a corrected list, shortages are reported to the executive officer. In the case of locked bags a note to that effect is made on the patient's card. Patients are then given a receipt for their bags and the bags placed on racks made of piping. For every patient whose baggage is received a filing jacket is opened in the bagroom. In it is placed a copy of the hospital ticket; the bureau's form No. 25, containing the patient's name, rate, ward, articles deposited, numbers of bag and hammock, and location on the bag rack; and supplementary receipts signed by the patient to cover articles withdrawn from the bagroom.

On the day of discharge from the hospital the patient reports to the bagroom for his bag and hammock and empties out and checks his bag in the presence of the bagroom keeper before signing the hospital ticket as having received all articles listed thereon. After final inspection by the officer of the day and just before leaving the hospital reservation, all patients are required to sign in a book that they have received all property belonging to them. If they claim loss at that time they are held off the duty party until the matter can be adjusted. This is to cover claims of loss from the wards and was inaugurated after a number of men, following their return to the training station, had written letters claiming that clothing and valuables had been stolen from them in the wards.

Two bagrooms are maintained, the main and contagious bagroom. Bags and hammocks of contagious cases are sent to the sterilizer before being transferred to the bagroom, and the clothing worn in the ward by the contagious cases is sterilized just before the patients are transferred to duty.

THE HANDLING OF DEAD BODIES.

The following clauses from the Hospital Organization and Order Book relate to this subject:

MORGUE.

- The morgue will be in charge of the laboratory officer, under the executive officer. All autopsies shall be done by a member of the laboratory staff. The medical officer in charge of the case at the time of death shall be present in every case.

The autopsy record book shall be completed in each case immediately after each post mortem.

Before a body is shipped it must be inspected and passed by the chief medical officer, or laboratory officer, who are supervisors of embalming, and by the officer of the day.

AUTOPSIES.

Obtain permission from the executive surgeon for all autopsies. Do not autopsy supernumeraries without permission from relatives or guardian, unless by order of the commanding officer.

The supervisor of embalming will inspect the body after embalming and before dressing. He will again inspect it for neatness of uniform. The ward officer is to identify the body before the casket is sealed. The casket is then to be sealed and labeled properly.

For bodies coming from the marine barracks, the officer of the day will call the officer of the day at the marine barracks, and request that some officer be sent from the marine barracks to identify the body.

Bodies coming from the training station are to be embalmed and dressed. The officer of the day will notify the yard dispensary or the medical officer of the training station to send some officer to identify the body. After identification, seal the casket and label properly.

BODIES OF CIVILIANS.

The bodies of civilians will be held without embalming until the civilian undertaker calls, unless the morgue is notified to the contrary. At the present time, a civilian undertaker in Vallejo has a contract for all work on civilians.

HANDLING OF BODIES.

The following is the method of handling all bodies. Any orders conflicting with it are hereby annulled:

1. Report of the death will be immediately sent to the personnel office. In case of a civilian employee report of the death will be telephoned to the yard dispensary immediately or as soon as the dispensary is open.

2. The officer pronouncing the man dead will see that the body is immediately tagged and sent to the morgue, together with all clothing in the ward.

3. The man in charge of the morgue will be responsible for the clothing. Articles not needed for dressing the body will be turned over to the personnel officer.

4. Bodies and clothing will be inspected by the officer of the day and by the supervisor of embalming and identified by the ward officer, the identification to include comparison of scars and marks with those on the health record. The officer of the day will make entry of such inspections and of the shipments of all bodies in the medical journal.

5. The officer in charge of the laboratory will be in charge of the morgue and will be responsible for the proper keeping of the morgue book.

The morgue book, kept by the hospital corpsman on duty in the morgue under the direction of the officer in charge of the laboratory, is a record of every body from the time it is placed in the morgue until it is either buried or shipped. It contains columns for date of death, name, race, diagnosis, autopsied by, embalmed by, buried (yes or no), shipped (yes or no), date, etc. The officer who performs the autopsy or does the inspecting signs his own name in the proper column.

GENERAL FILE AND CLINICAL RECORD SYSTEM.

By D. C. ALLEN, Lieutenant, Medical Corps, United States Navy.

In the early part of 1918, following the expansion of the U. S. Naval Hospital, Mare Island, Calif., to several times its prewar size, we were brought face to face with the problem of enlarging, centralizing, and amplifying our filing system, and also of providing for the retention of clinical data. The files were scattered throughout the several offices. The personnel and material system of filing was used. The filing was performed after office hours by the hospital corpsman having the office watch. Frequent changes were made in the office personnel, and consequently the misfiling of many important papers occurred. Much annoyance and a considerable loss of time resulted from the necessity of searching through a large number of jackets in an effort to locate misfiled papers.

To overcome this difficulty, the files were centralized by placing a floor in and fitting an adjoining light well 7 by 15 feet, into a small but businesslike central file room. A yeoman (female) enrolled for this special duty was placed in charge.

The filing system was amplified by using an 8 by 5 manila card slightly heavier than the official cap size paper as an extra carbon

copy. The card contains the subject and usually the whole of a letter of ordinary length. The name of the person or article referred to is typed in caps near the top and the number borne by the file copy placed in the upper left-hand margin of the card. It is thus alphabetically filed. Should the letter be of an abstract character, referring to more than one person or article, it is filed alphabetically by subject. Incoming letters of importance are cross indexed and filed as above.

The importance and necessity of retaining clinical data became both evident and imperative as the number of patients increased. The information contained in the general register was insufficient to properly and intelligently reply to correspondence received from official and personal sources in the case of patients no longer in the hospital.

For each and every patient admitted a clinical record jacket is opened at the receiving desk, and immediately sent to the files, where it is placed in the live files and cross indexed under name and disease. In addition to clinical data, all papers of individual or personal character are filed in the jacket. It is obviously needless to enumerate the many advantages in having all papers pertaining to a patient filed in his jacket, instead of having the papers scattered throughout many jackets, as is the case in the subject file.

However, it might not be amiss to mention the advantages afforded to medical officers in the event that it is desired to obtain statistical data for reference and study of a certain disease. There is also the satisfaction of referring to readily accessible clinical records when called on to furnish information concerning a case treated sometime in the past; while prior to the establishment of the clinical record system it was necessary to resort to memory or the Bureau of Medicine and Surgery for such information.

The increased volume of papers and work incident to the establishment of the clinical record system has rendered the present file room and its facilities entirely inadequate. Therefore a room 18 by 36 feet, directly below the personnel office, has been converted into a file room. It is connected to the upper office by a stairway leading through the light well referred to above, also by a mechanical lifting device, a paper chute, and by speaking tubes. With the exception of desk and chairs, the room will be furnished with the latest type of metal filing equipment. The old homemade wooden cabinets will be done away with as soon as the new equipment is received.

To summarize, the centralizing of all the hospital files in charge of a file clerk (civil establishment) with a hospital corpsman as an assistant, is highly satisfactory and an improvement over former methods. The amplification of the personnel and material system by the use of a card as a carbon copy alphabetically filed has been

fortunate and a decided step in foolproofing this system. The large and completely equipped file room now being placed in commission is in keeping with the expansion of the hospital, will care for our future needs, and is believed to be on a par with the record-keeping systems of our largest civil institutions.

SUGGESTED CLINICAL CHART.

By M. C. Baker, Lieutenant Commander, Medical Corps, United States Navy.

The accompanying clinical chart is submitted with a plea for its adoption, particularly for use in naval hospitals. The advantages following are claimed.

U. S. NAVAL HOSPITAL,

[illegible]

1. In general it presents a more or less complete picture of the case on a single sheet, where it may be readily grasped.

2. By showing the maximum and minimum daily temperature (b. i. d. temperature) it gives a much clearer picture of the course of the disease, and, incidentally, a single sheet shows this for a considerably longer period of time.

3. All readings of the chart may be made while the chart is in its normal upright position.

4. Space is provided for recording not only the day of the month but also the day of the disease and the daily number of stools.

5. Most of the usual routine laboratory findings are listed, with a space for the date of each, which may be quickly seen and compared.

THE THEATER AT THE NAVAL HOSPITAL, MARE ISLAND.

By T. C. HART, Chief Pharmacist, Medical Corps, United States Navy.

This hospital has an attractive and completely equipped theater.

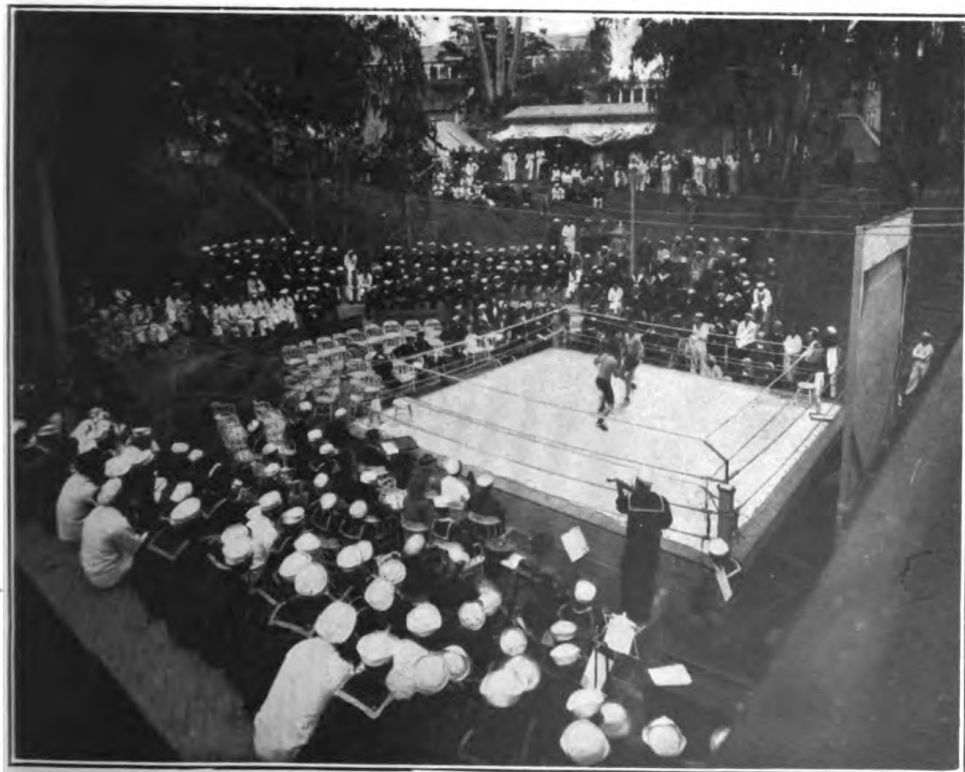
As everyone knows, the introduction of moving pictures at the hospitals and other stations of the naval service marked the dawn of a bright day for the men of the service in general, but most particularly for the men who were sent to hospitals for treatment and were unable for proper reasons to get liberty and thus find entertainment ashore. Usually, and this hospital was by no means an exception, the place relegated to the use of patrons of the cinematograph was some out-of-the-way corner or room of insufficient size, or perchance a mess hall with improvised platform for the machine and almost any kind of a curtain provided it was white.

This was the case at this hospital until in 1918 an old one-story building, formerly quite popular with some of the men of the west coast navy and known as "I Ward," and later used as quarters for the Hospital Corps, was finally abandoned as new buildings took its place. The old building, however, did not meet the fate of being pulled down, as at first seemed inevitable, and the timely decision of the commanding officer to convert it into a theater proved a wise and providential one for the inmates of the hospital, and demonstrated a keen foresight and kindly interest in the comfort and welfare of the patients.

The structure having been erected some years ago was in need of repairs, and new supports were placed under it and new sills put in, after which the floor joists were sawn on a line beginning at the front and running up to two-thirds of the length of the building and a distance of about four feet from either wall, the floor being lowered in such a way as to permit of the proper incline of the floor



Theater, U. S. Naval Hospital, Mare Island, Calif.



Open-air arena, U. S. Naval Hospital, Mare Island, Calif.

toward the stage that had to be built on to the old building in the rear. The stage was patterned after the up-to-date stages of to-day, but instead of having the dressing rooms under or above the stage, they were appropriately placed on either side.

The question of scenery was at first a cause for much concern, as we had no one who could paint such things and no money to hire an artist to do it. However, in the end it was accomplished by a great deal of search on the part of Pharmacist W. S. Burr, who finally located a man in the naval training camp, a seaman, who was kindly loaned, and who graciously put us "on the map" for scenery. The curtains and canvas were made in the navy yard. Meanwhile, chairs were to be taken into consideration, and as there were never any too many chairs for other uses at the hospital, chairs had to be obtained somehow, as well as other requisites that make up a complete outfit of theater properties.

In order to obtain assistance for the purchase of chairs, etc., and provide a suitable program for the opening of the theater, Lieutenant E. G. Dickenson organized the musical comedy, *The Rose of Queretero*, using as material the men of the Hospital Corps and others attached to the hospital. He experienced considerable difficulty in obtaining costumes and other paraphernalia, the members paying out of their own pockets the amount necessary. This play, with the commandant's permission, ran for a week at the Columbia Theater in San Francisco, under the management of W. S. Burr. The receipts obtained were satisfactory, and a generous amount was donated to the American Red Cross.

An orchestra composed of hospital corpsmen was organized, and, after a few rehearsals for an hour each day, become so efficient and popular with its "jazz" that it was in great demand, and proved conclusively that the Hospital Corps can accomplish wonders when the proper get-together spirit exists. It would have been difficult, indeed, to have found more harmony and good will among the personnel of a hospital. Moving pictures were shown every evening, beginning at 6 p. m. and ending at 8 p. m., to packed audiences, except on Thursday, when vaudeville entertainers put on their five or six acts, which recently have been increased to seven.

Wednesday, November 26, 1919, will be a day long remembered around San Francisco Bay and among seafaring men of the west coast as usher to one of the worst storms in many years in this district. It lasted for three days, causing many fires in the bay cities from broken electric wires. On the afternoon of the 29th the insulation on the electric wires in the overhead of the theater gave way, causing a shortage and it is presumed that the sparks falling on the old dry ceiling caused it to catch fire. This made quick work of the top of the building and curtains, flies, and scenery before any

one became aware of the flames. As a matter of fact the first indication of fire was observed by the man in charge of the building, who, while writing a letter in one of the dressing rooms off the stage, was suddenly startled by the falling of a curtain. The alarm was sounded at once and the quick response to the call by the hospital fire department, composed of hospital corpsmen, patients, and civilians, again proved that this was a capable and efficient unit in extinguishing a blaze. Had it not been quickly controlled it must have proved disastrous to the main building.

The loss of the theater was a sad blow to the large number of patients then at the hospital. They were compelled to forego their pleasant evenings in the cheerful atmosphere of the theater. The two moving-picture machines, most of the theater chairs, and one piano were saved, along with a few pieces of scenery. The machines were immediately transported to the outdoor arena machine booth, where open-air pictures had previously been shown, and the program continued in good weather. The men in true sailor fashion being game to the last ditch donned their peacoats and gloves saw it through, even though they may have had occasion to swing their arms and stamp their feet to keep warm.

The success of the old theater in furnishing high-class amusement for patients, hospital corpsmen, nurses, and officers had been so evident that it left no doubt in the minds of all concerned that it should be rebuilt without loss of time. Immediate steps were therefore taken by the commanding officer to have the rubbish removed by working parties composed of convalescents who bent to their tasks with right good will and soon completed the work. In a short time the old shell of a building, of which only the walls remained, again assumed the appearance of a quite respectable building, and by the time the carpenters and painters were through inside, the seats had been repaired and were ready to be put back in their old places. Once more William Hamm, received the S. O. S. and answered the call of his old shipmates in pure sailor fashion. Arriving from his ranch full of enthusiasm and sympathy, he put forth his best efforts and in 30 days we were again well equipped, flying a full set of stage scenery, curtains, and everything.

As funds for the payment of all the paraphernalia to be installed were a negative quantity, and as there will be those who wonder where this money came from, it may be of interest to the reader to know that the spirit of harmony and good will prevailing at the hospital, extended even farther than the compound, and through this spirit the way was pointed out by Mr. John B. Browne, field director of the American Red Cross, who with the assistance of the officers and officers wives of the navy yard, organized the Mare Island "Players Club" and were ready for the opening of the new theater

on March 8, 9, and 10, at 7.30 p. m. with a most brilliant program of entertainment.¹ The first night was for rehearsals, the second night for the enlisted personnel only, and the third night for the officers. The popularity of the plays and players was so great that the theater capacity of 500 could not possibly accommodate all at one time. The theatrical performance each night was followed by a bazaar in the Red Cross Building; a real old time bazaar of the days of forty-nine, such as you read about, with dancing.

A SOCIOLOGIC AND PSYCHIATRIC STUDY OF 100 NAVY DESERTIONS.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, United States Navy, and W. H. WILSON, Lieutenant, Chaplain Corps, United States Naval Reserve Force.

Official statements on the subject of desertions from naval service during recent months referring to it as "appalling," make us profoundly interested in the causes which may lie back of this utterly unpatriotic conduct. We are told that "in January, last, there were 898 desertions, including 103 petty officers. In February there were 765 desertions, including 60 petty officers, a reduction from the previous month attributed to the fact that the (Atlantic) fleet went south and there was less opportunity to desert." (1.)

Many popular explanations have been offered varying from the inadequacy of the present rates of pay of enlisted men to after effects of war, social unrest, tendency toward Bolshevism, autocratic lack of understanding and sympathy for the recent enlisted man by officers, all ending in that general term of elusive meaning, "morale." All these have been made to account for this wholesale repudiation of allegiance to the service. In order to obtain the reasons and motives of those who have been apprehended for desertion and to derive some explanation from the viewpoint of the delinquent himself, the following investigation into the cases of 100 men returned to Mare Island for desertion was made by a series of questions and individual character studies during personal interviews. The motives for enlistment and for desertion were particularly dwelt upon in order to obtain the man's own point of view. The other questions were asked as revealing the antecedents of the men and offering factors for character judgment of the individuals concerned.

No study of behavior or conduct would be accurate or worth while if it were not far-reaching enough to take into consideration a detailed study of the individual elements that form the underlying basis of conduct. The subject of behavior and conduct is among the most abstruse of present-day medico-sociologic problems. Its men-

¹ Plays given at reopening ceremonies: Food, A Comedy; Dent's Laughter; Prologue to Androcles and the Lion.

tion is only made to bring to view a few of the more important concepts necessary to a proper understanding of the topic at hand. The trend of recent teaching seems to be away from the mechanistic toward the more lately conceived dynamic psychology.

The motives back of behavior and conduct are the end result of the interplay of many mental processes themselves depending on still more elemental factors. We are endowed with certain tendencies or predispositions (2)—instincts—native to the process of behavior, and conditioned primarily by inheritance and latterly by environment, exercise, and training. Grouped about these native forces of the process of behavior are the memories and impressions of past experiences, variously arranged and with manifold associations, all of which modify the primary intent to motor expression of the original instinctive impulse. From the interaction of this innate process with the perceptions coming from an environmental condition arise many thought motives, from which the faculties of reason and judgment select a final motive that best meets the individual's point of view. This may be a very brief summary process with spontaneous or almost immediate action, or if the involved memories, associations, judgments, and reasoning factors be many and complex it may be a very long and deliberate one.

The ability to store up accurate memories and to form accurate judgments therefrom is a matter of native intelligence (3). A measurement or estimation of the value of these factors must be a part of any study of conduct. A consideration of the heredity, the native temperament, the early environment and history of reactions to it, and the records of intelligence tests, becomes most important. In order to pursue an incontrovertible, unvarying method carefully outlined case histories were kept. Actual cases of naval desertions from all branches of the service and particularly those of enlistment since the signing of the armistice were considered. An effort at analysis of all neuropsychiatric factors, social factors, instinct factors, and matters appertaining to the mechanisms of character formation was made. A method of procedure was outlined and followed as a careful routine for each individual. These interviews were held privately and informally in each case and the confidence and interest of the subject was obtained by asking his cooperation in the investigation. In no single instance was there found to be reluctance or equivocation in the attitude of the individual as far as pertained to his personal attitude, or his point of view; that is, excluding his temperamental tendency, which was taken into consideration.

A careful family history was obtained in each case, especial search being made for all items involving social status, antisocial tendencies, neuropsychiatric trends, family discipline, and domestic relations.

The personal history of the subject's prenaval career, including environmental, antisocial, and educational elements, was ascertained. His naval record as it pertained to his ambitions and delinquencies was brought out. His attitude toward the institution of the Navy, the officer personnel, both warrant and commissioned, and toward his shipmates was learned. Furthermore such additional factors as his pleasures and diversions, his athletic interests, attractions while on leave were inquired into. Whatever motives and promptings actuated the man at enlistment were brought out and the later qualifying of these by his actual experience in the service. This served to define clearly the causes of dissatisfaction that prompted desertion. The examination was completed with an estimation of the intelligence using the tests of the Stanford Revision of the Binet method (4).

The accompanying schedule of procedures and investigations was followed. This was drawn up as laying before us all the probable conditions to which desertions could be due. The guide and test being the powerful urge to express personality along the lines laid down by instinctive predisposition activity, as well as popular and currently ascribed factors.

The figures show to what extent in per cent each of the enumerated factors or attributes were present in 100 cases, or, better stated, in 100 possible opportunities for its occurrence. These several factors usually are not individually productive of desertion, but when several of them are grouped together in a single individual a clear background for the act of desertion can easily be made out. These concomitant factors frequently become synergetic factors, each one aiding and abetting the others into the untoward act or antisocial behavior. This concomitancy is more than incidental or accidental. The groupings show actual relation of cause and effect, often direct, more often remotely indirect, but of none the less true relationship. The simultaneous occurrence of poor heredity, poor environment, and poor personal history is one of direct causal relationship. The poor heredity existent in the parents provides a poor environment, and the interaction of poor heredity with poor environment produces a bad personal history and a poor mental state. The heredity thus defines the environment, and the environment intensifies the heredity.

With a poor heredity the quality of the instinctive predispositions is inferior, the objects afforded by the environment for their activity are unworthy, poor habits of mind and conduct are formed and firmly fastened into the individual's character. This is clear in the case of the alcoholic who is reared of an alcoholic parent, who in turn was probably of an alcoholic grandparent; the environment provided by the parent intensifies the heredity; together they define the personal history, and all these typify the mental state. In this

connection the consideration of the factors of heredity in this series are highly illuminating. In 15 per cent there was insanity in the parents or in a brother or sister of a parent. In 12 per cent there was definite neurotic taint of various types in the parents, and this exclusive of the insanity. A further 10 per cent exclusive of the other two, of definite alcoholism in parent, not occasional drinkers but habitual drunkards, was found. And finally, 9 per cent showed antisocial conduct in parent of whom two were guilty of homicide. Of these latter, 6 were also alcoholic, making in all a total of 40 per cent of decidedly unfavorable heredity. A further factor of note is that only 30 per cent of fathers were skilled laborers while 63 per cent were unskilled. In 7 per cent the fathers had died early in the life of the subject. The following illustrative case histories are cited.

Insanity in heredity.—Mother in asylum, mother's brother also in asylum for insane. Subject, age 19. Was in sixth grade at 14 years. Mental age, 14 years. From Eastern States. Left home first at 18 years. Had had only two employers. No home discipline. Self-assertive, obtrusive personality. Evident psychotic tendency. With four others attempted a holdup with a gun. Stole a bicycle while on liberty. In six weeks' desertion did not work. Served one year prior to desertion.

Neurotic taint in heredity.—Mother had many "nervous spells" with screaming and spasms. Father nervous and irritable, was a gambler. Subject, age 18 years, attended first-year high school; mental age, 15; normal; from Central States. Self-assertive personality with exalted self-opinion. On report several times for minor offenses. Stated he deserted because he could not get transferred to Great Lakes. Service about three months. Never held any other employment.

Alcohol in heredity.—Father a drunkard. Subject drank from early youth. Age, 32. Was in seventh grade at age 15 years. Mental age, 15 years; normal (slow reaction). From Central States. Two and one-half months' previous service. Four months in desertion. Separated from wife. Stated he was on 15 days' leave, ran out of money, and couldn't get back.

Crime in heredity.—Father in prison for 10 years for homicide. Father "quick tempered." Subject, age 16 years. In sixth grade at 14 years. Mental age, 13. Seclusive with mannerisms. Has been arrested twice for vagrancy. Enlisted to see the world. Wanted sea duty. Worked in 25 different places in one year. Four months' service prior to desertion. In desertion 33 days. Arrested and brought back. Worked as a casual laborer.

The unfortunate product of poor heredity and environment has become habituated to act in an antisocial manner upon slightest provocation, because that has been the teaching of his environment.

The environment, as has been stated, can be well estimated by the family history. In addition it is of interest to note the generalized and fairly equal distribution of origin. Eastern, Southern, and Central States provided 29, 21, and 27 per cent, while Northwestern and Western provided 8 and 15 per cent. These differences are probably similar to the differences in population density in these regions, so that from this series it could not be inferred that any one region provided more delinquents than others. Inquiry into home discipline, as to whether subject could always do as he pleased, or was obliged to obey home regulations, showed that only 27 per cent were strict, 73 per cent were lenient or easy-going, with little interest in child, his doings, and associations. Four were full orphans, 26 were half orphans, 1 was raised in an orphanage, and 4 were inmates of reform schools.

The following are illustrative cases:

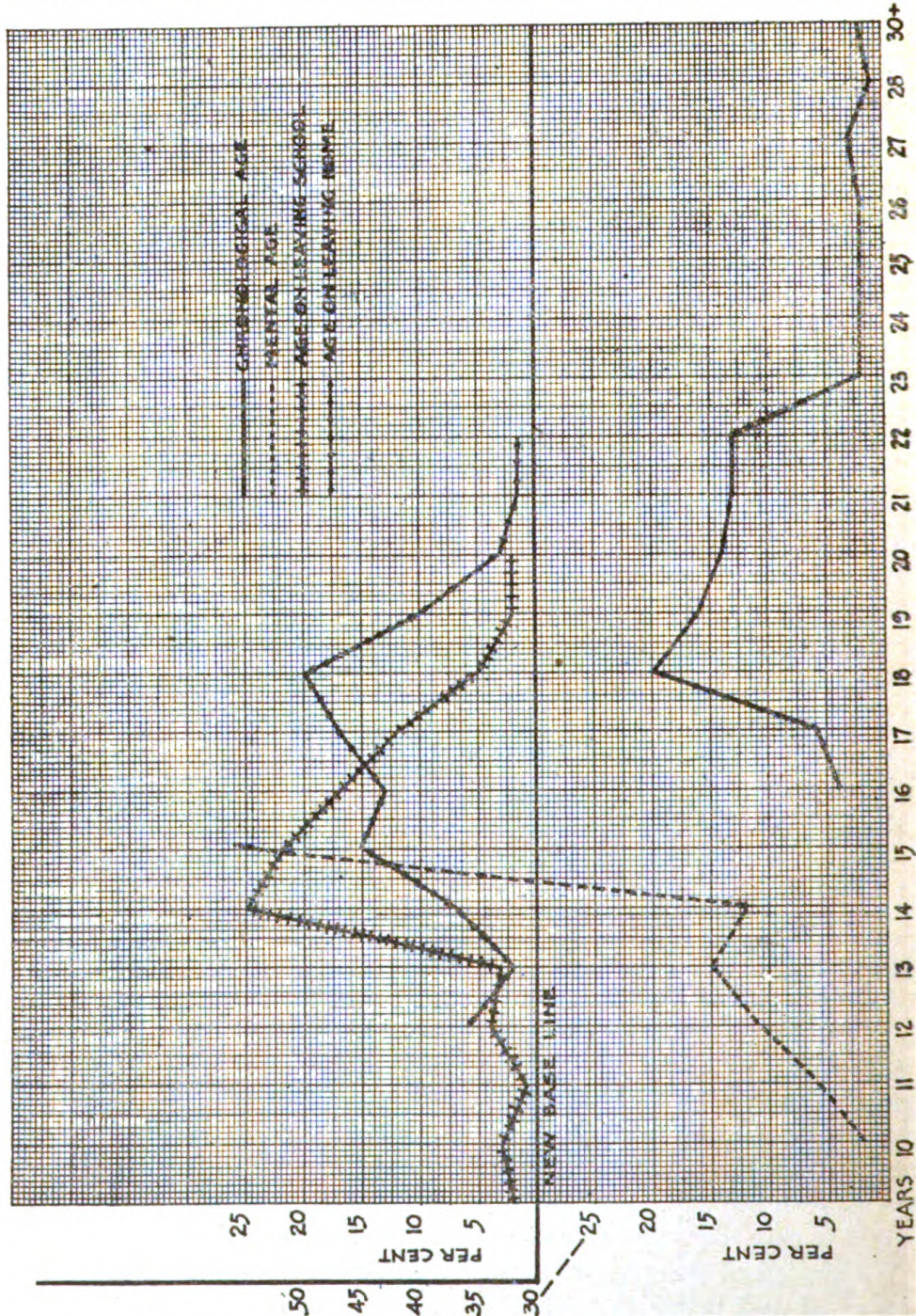
Mental defective reared with poor family discipline.—Father a successful miller; negative for hereditary taints. From Western States. Age 19. In seventh grade at age of 17, mental age 13; constitutionally inferior with assertive, obtrusive, egoistic personality. A civil court had sent him to reform school for 31 months. First left home at 15. "Father let me do as I pleased. He was too good to me." Enlisted against parents' wishes to get free from charge of automobile stealing. Deserted first time after only 21 days' service. Broke arrest twice thereafter while awaiting trial. Was raised by stepmother; mother died when subject was 2 years old. Assigns influence of others as cause of desertion.

Mental defective reared in orphanage.—Mother died when subject was 2 years old, father a suicide the next year. Age of subject, 19. In fifth grade at age 16, mental age 12. Dementia praecox type of temperament, has a psychotic tendency. From Central States. Service 5 months; was on 48-hour liberty; claims he lost his return ticket, and had no money, and after 10 days was afraid to return.

Mental defective reared in reform school.—Father captain of fishing boat. Sister had St. Vitus dance. Age, 19 years. In fourth grade at age 16, mental age 14. In reform school for four years for repeatedly running away from home. From Eastern States. Has a roaming disposition; traveled all over country. Constitutionally inferior, with seclusive temperament. Stated he deserted in order to return to east coast and to escape duty aboard battleship.

We are led to observe the more immediate personal attributes, the history of past behavior, and other matters learned from the subject himself. As to age, 10 per cent were below 18 years, 62 per cent were between 18 and 22 years, and 28 per cent were above this age. In regard to schooling, 23 per cent had not reached the sixth grade, 56

per cent had not gone beyond the eighth grade, and 21 per cent had had partial high-school training. The ages of leaving school were 43 at 14 years or below, 20 at 15 years, 16 at 16 years, 12 at 17 years,



and 9 at 18 to 20 years. As an indication of interest in the home, we find 6 left home at 12 years, 9 between 13 and 14 years, 16 at 15 years, 62 between 16 and 19 years, and 7 thereafter. As to belief 57 professed to be Protestants, 39 Catholics, and 4 professed no religion.

Significant of the general shiftlessness and instability of many are the number of different places of employment. Twenty had never been employed, 20 had only 1 place of employment, 26 had 5 places, 11 had 10 places, 16 had worked in 20 different places, and 7 over 25 places. Fifty-four enlisted with consent of parents, 46 against the wishes of parents. Seven were guilty of some form of antisocial conduct in civil life and had served jail or prison sentences therefor; 1 a homicide. In addition there were 10 cases of minor crimes and arrests, or 17 per cent in all, a striking exposition of the effect of heredity and environment on conduct, especially in the light of the finding that 10 of these were mental defectives and 13 showed neurotic tendencies.

It thus becomes clear, as has been stated before by other workers. (5) that the personal history itself furnishes an excellent clue as to the character make-up and psychopathic tendencies of the individual. (6)

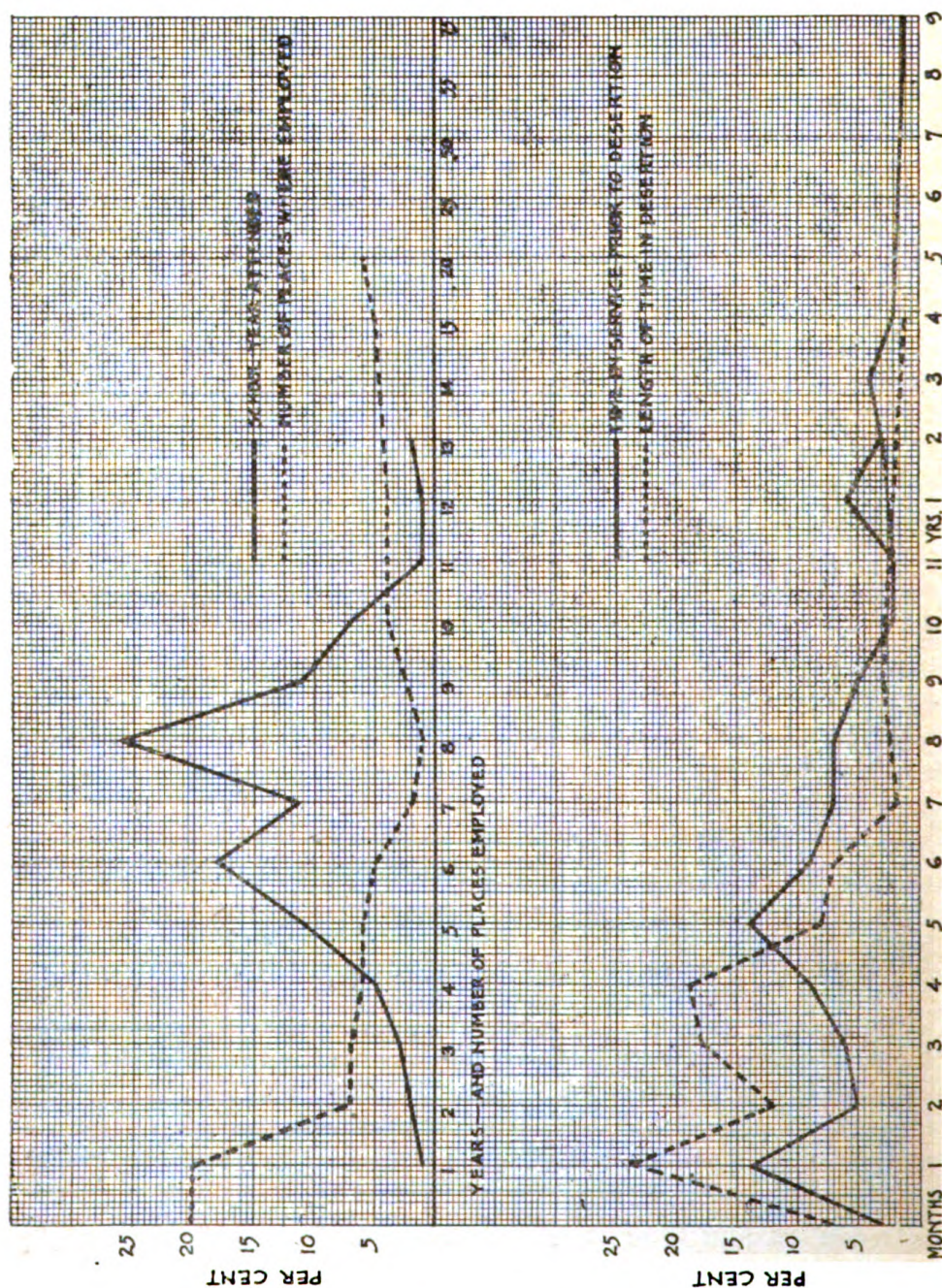
When we consider from what branch of the service the delinquent deserted, we find 41 per cent were seamen, 27 per cent were firemen, 15 per cent privates—in all 83 per cent—leaving 17 per cent to be apportioned among skilled and advanced ratings, showing that men whose heredity and environment gave them intelligence and sufficient adaptability to gain a higher rating were also of sufficiently high type not to be susceptible to antisocial or antinaval conduct. This is further brought out in contrast with regard to the period of service prior to desertion. Seventeen per cent had less than three months' service, 21 per cent less than six months, 14 per cent less than nine months, and 10 per cent less than one year. In other words, 62 per cent were so unstable that they could not give their new undertaking of Navy life a year of trial or of continuous effort. A further point of interest is that during their short period of service and considering all the allowances made for recent recruits 25 per cent were guilty of various gross and minor naval offenses, many of whom were offenders three or four times, often of the same offense.

From the examination into the mental state existent at the time of interview much is to be learned about the influence of the factors of heredity, environment, and their interaction. In the matter of intelligence estimation the following findings are recorded: Four were graded at mental age of 10 years, 6 at 11 years, 9 at 12 years, 15 at 13 years, and 13 at 14 years, leaving only 63 per cent as of 15 years or of adult intelligence. Here is a case in point:

Mental defective with intelligence of 11 years.—Age, 20. Was 16 years when in sixth grade; mental age, 11. Continually avoided all manner of duty. Said that a summary court was a mere matter

of saving money, as he could not save any other way. Broke arrest as initial step of desertion.

A low-grade mentality is unable to fulfill the expectations of normal life, and because of this inadequacy often lends itself toward the



expression of some form of psychotic trend and, if the maladjustment is allowed to progress, to some form of true psychosis. These are usually defined by the natural innate type of temperament make-up of the individual.

There were found 15 per cent of dementia praecox type, 8 per cent manic-depressive type, 7 per cent hysteric type. Constitutional inferiors were 6 per cent, 4 of whom were bed wetters and 3 afflicted with speech defects. In addition there were found 1 drug addict, 2 sexual perverts, and 14 alcoholics. These 14 alcoholics were definite heavy drinkers, not casual drinkers. Seven of them came from alcoholic parents, 7 were mentally deficient, and 12 showed neurotic taint. Twenty-six were considered as having an emotionally unbalanced personality. And, finally, from this viewpoint of defective personality the egoistic and introspective type were present to the extent of 23 per cent with self-assertiveness and obtrusiveness (7); 11 per cent with exalted opinion of self, 5 per cent with feeling of inadequacy. Another 15 per cent were of seclusive and fatuous make-up (7).

Reference to the accompanying schedule will show that many of these types in addition to being defective in regard to character formation are defective in intelligence. In fact such is largely the case.

Illustrative of this rather high percentage of low-grade mentality are the remarks heard at times from men of long service who assert their aversion and chagrin because of the difficulties presented in attempting to train many of the more recent recruits. This, of course, should be subject to the modification that the enlisted personnel of the war Navy was of very high standard. Men who for the most part volunteered came into the service often after considerable sacrifice of position and station, many being very mature and of high-grade intellect, were driven into the heartiest kind of cooperation and allegiance by the motive of the emergency. This high standard has affected and developed an abnormally high expectation of the enlisted personnel.

It is true that a good environment, even reacting with a poor heredity, will produce a better type of personality and make for greater efficiency than a bad environment. It is further to be realized that probably throughout society great numbers of mentally deficient have found a level upon which they can live and, in a sense, be self-supporting and self-respecting members of society. (8) Their responsibilities in life are usually, however, no greater than their ability to bear them, and while their tendency to maladjustment may be greater than normal, still civil life is a fairly flexible institution in which the gravitation of an individual to his own level of comfortable surroundings is a natural and easy thing. It is not in the nature of events for everyone to be of high-grade mentality; and in every institution there is a place for the individual of mediocre talents in order that those of greater ability may devote themselves to the development of the more difficult situations. The Navy needs

“hewers of metal and drawers of oil” as much as any, but the individual who finds himself content at that level should not be held to the same degree of accountability as a normal individual, especially for military offenses, many of which depend upon the finer qualities of manhood for their avoidance. The normal conduct of the Navy unconsciously provides for the proper handling in general of such a situation, for it is a generalization that degree of responsibility goes with degree of intelligence.

Following the naturally to be expected after-the-war exodus there has been a great infusion of callow youth into the service, and because of the great numbers and because of the excessively good opportunities in civil life for the individual at present, our attention has been more than usually drawn to the defectives and misfits. As conditions readjust themselves in civil life the situation in this regard in the service will rapidly change. In anticipation of this, however, further consideration of our present material can be given along regularly recognized lines. Mental ratings and psychiatric group analyses should be made at enlistment and at certain periods thereafter. It would seem that an institution with so many intricate interworking parts would find some form of such systematized examination useful, as it is being regularly found in some of the larger industrial units in civil life (9). Some such procedure for those awaiting action of trial for the more serious forms of delinquency would assist those sitting in judgment to more accurately fix the degree of individual responsibility (10).

As to an analysis of causes which might be ascribed as being of possible sufficient force to urge a fairly well-balanced mind into an antisocial act, such as desertion, it would seem that the only accurate and true criterion of their value as a legitimate force would be that gained from the standpoint of the instinct-predisposition—activity—supposing this to be of normal strength and directed toward a socially accepted objective. The financial considerations in desertions viewed from this standpoint present this proposition: Wherein does the assumed financial inadequacy sufficiently obstruct the activity of the major instincts? Herein comes the ability and need to provide for dependents of immediate family ties. In an effort to check back on such factors by ascertaining what advantage was taken of the opportunities afforded by the service, it was found that 52 per cent had insurance, 20 per cent class B allotments, and 4 per cent class A. Earning power prior to enlistment is estimated as 25 per cent skilled labor and 75 per cent unskilled. During the period of desertion 32 per cent were not employed, 58 per cent were casual, and 10 per cent were skilled laborers. Two per cent claimed vital property interests at stake which needed the application of finances to retain.

And as to the somewhat misjudged (by the delinquent) importance of the minor instinct desires, 7 per cent claimed they could not save any money; 8 per cent wanted clothes and features of display, 7 claimed insufficient funds for social spending, and 6 financial inadequacy for amusements.

The factor of the directive guidance of the instincts in determining the behavior of the able-minded must also be considered in estimating the value of the statements of the discontented individual who for various ascribed reasons believes the service does not provide sufficient interest and promise worthy of his allegiance. In this regard it may be well to consider for a moment the primary intent motives at the time of enlistment:

34 stated patriotic purpose.

6 were influenced by Navy recruiting advertisements.

23 wanted to travel and see the world.

7 to learn a trade.

8 were governed by impulse.

5 enlisted with companions going together.

1 had served 3½ years in the Canadian Army and enlisted to restore his citizenship.

1 for aviation.

4 were influenced by recruiting officers.

3 had trouble at home and joined the Navy.

1 wanted treatment for syphilis.

6 influenced by other enlisted men.

1 on strike, had no work.

Against these we find from lack of opportunity for self-betterment or self-assertion, 6 who claimed they could get no advancement; 3 could not change their rating into a more desired branch, and 7 per cent could not learn a trade, making 16 per cent in all. Of the remainder, 28 per cent were satisfied with rating as expressing their ambitions and desires, while 56 per cent evidenced no particular interest or ambitions of any kind for the future.

For the lack of gratification of such desires as roaming, rivalry, pugnacity, captioned under the heading "Spirit of adventure," it is found that 43 per cent deserted from shore stations while only 10 per cent came from destroyers. Reference to the attached schedule will show that there is a close inverse relationship between cruising and desertions. Twenty-eight had seen some form of foreign service and 58 some form of sea duty, including those with foreign duty; in other words, 42 per cent had had no form of sea duty, and in all probability many had not been in the service long enough to know one type of craft from another. Twelve made definite unsuccessful efforts to change to sea status. Ten deserted, or were primarily absent over leave with the definite intention of facilitating their opportunity to be sent to sea. The following is a case in point:

Absence over leave with intent to gain sea duty.—Age 18; was in sixth grade at age 17; mental age 15; normal. Speech slow. Service 4 months. Desertion period 35 days. Traveled from Great Lakes and reported in at Mare Island "where the ships are all stationed."

In recreation (games of rivalry) 20 per cent took part in some form of organized athletics, mainly football, baseball, and boxing. As to other modes of pleasure no factors of note were obtained.

Only 6 complained of being restricted by the routine of service liberty; only 1 about choice of clothing. No one in the entire series complained of inability to have a home. Thirteen were denied leave and decided to take it anyway, 3 claimed parental distress, 3 claimed family distress, 2 property interests needing attention, and 3 had had no leave after long-continued service and felt it due them.

Twenty-four considered themselves misused; 9 believed they had been oversensitive; 4 more claimed to have been held against their desire for change of duty in order to maintain a local efficiency; 4 claimed overseverity of punishment—1 with regard to his idea in civil life and 3 in comparison to similar offenses in others.

In recapitulation it is clear that popularly claimed financial considerations, matters of adjustment to officer personnel, or innate conditions of service are really not factors at all in desertions. This is further emphasized by reference to the attached schedule wherein the value of the few complaints made can be estimated by the high degree of mental deficiency or neurotic taint present in those who made them. The real factor is the unfitness resident in the delinquent himself. There may be added to this as an exceedingly minor factor the desire for gratification of a spirit of adventure as expressed in an effort to gain sea duty. Here again, however, by reference to the schedule one is faced with a high degree of mental deficiency and neurotic taint.

And, finally, much is to be learned from the immediate or initiating cause or impulse behind the act of desertion. A reference to the schedule shows that 37 per cent were primarily absent over-leave, and fear of punishment for this or other offenses explains the action of 11. Nine, 8, and 11 were guilty of overleave initiated by sex influences, alcohol, and having a good time, respectively. A few further minor reasons are also shown on the schedule. And here again in striking prominence is shown the relation of mental deficiency and neurotic taint. Of the 37 per cent absent over-leave, 20 were mentally deficient and 21 were afflicted with neurotic taint.

Behavior and conduct are prime factors to the world at large in the estimation of personal values. But behind these lie the many permutations and combinations of biologic elements. These must be separated and sought after until the deep underlying elements are brought to our view and consideration. In behavior and conduct

the prime elements are heredity, environment, and personal history, and the greatest of these is heredity.

The figures in the second and third columns indicate the number of those who were found to be mentally deficient or of neurotic taint among the designated responses recorded. These thus modify the estimation of values of the figures in the first column from the various viewpoints concerned.

A word of appreciation is expressed for the kindly cooperation in this study by the commanding officers of the naval prison, the receiving ship, and the naval hospital at Mare Island.

Analysis of probable factors involved in the act of desertion.

	Number found in 100 cases.	Mentally deficient among these.	Neurotics among these.
I. Due to conditions of mentality:			
A. Heredity—			
1. Insanity in the family.....	15	10	14
2. Neurotic taint in the family.....	12	7	11
3. Alcoholism.....	10	6	7
4. Antisocial conduct in the family.....	9	7	8
5. Occupation of parent—			
(a) Skilled.....	30		
(b) Unskilled.....	63		
(c) Dead.....	7		
B. Environment—			
1. Locality, hails from—			
(a) Eastern States.....	29		
(b) Southern States.....	21		
(c) Central States.....	27		
(d) Northwestern States.....	8		
(e) Western States.....	15		
2. Home discipline—			
(a) Strict.....	27		
(b) Lenient.....	73		
3. Orphans.....	4	2	3
(a) Half orphans.....	26	12	10
4. Reform school inmates.....	4	4	4
5. Orphanage.....	1	1	1
C. Personal history—			
1. Chronological age.....	(1)		
2. School year attended.....	(1)		
3. Age left school.....	(1)		
4. Age left home first.....	(1)		
5. Religion—			
(a) Catholic.....	39		
(b) Protestant.....	57		
(c) None.....	4		
6. Number of different places of employment.....	(1)		
7. Enlistment with parents' consent.....	54		
8. Antisocial conduct prior to enlistment.....	17	10	13
9. Prison inmates.....	7	4	5
10. Naval status—			
(a) Rating—			
Chief petty officer.....	2		
Machinist's mates.....	3		
Carpenter's mates.....	1		
Corporal.....	1		
Oiler.....	1		

¹ See curves on appended charts.

Analysis of probable factors involved in the act of desertion—Continued.

	Number found in 100 cases.	Mentally deficient among these.	Neurotics among these.
I. Due to conditions of mentality—Continued.			
C. Personal history—Continued.			
10. Naval status—Continued.			
(a) Rating—Continued.			
Engineman.....	1		
Cook.....	1		
Coxswain.....	1		
Bugler.....	2		
Quartermaster.....	2		
Hospital apprentice.....	1		
Fireman.....	27		
Private.....	15		
Seaman.....	41		
(b) Service prior to desertion, in months.....	(¹)		
(c) Period of desertion in months.....	(¹)		
(d) Naval offenses.....	25	15	19
(e) First enlistment.....	90		
(f) Army service.....	16		
(g) Ambition for future—			
Trade.....	41		
School.....	1		
Navy.....	2		
None.....	56		
D. Examination into the mental state—			
1. Mental age.....	(¹)		
2. Alcoholism.....	14	7	12
3. Psychotic or neurotic trends—			
(a) Dementia praecox.....	15	13	7
(b) Manic-depressive.....	8	5	8
(c) Paranoid.....	2		
(d) Epileptic.....	0		
(e) Hysteric.....	7	3	7
(f) Constitutional inferiority.....	16	11	12
(g) Sex perverts.....	2	1	1
(h) Drug addicts.....	1		1
(i) Syphilis.....	2		1
4. Emotionally unbalanced personality—			
(a) With fears.....	3	1	2
(b) With obsessions.....	3	1	3
(c) With conflicts.....	19	9	17
5. Egoistic and introspective personality—			
(a) Assertive and obtrusive personality.....	23	11	16
(b) Opinion of self—			
Exalted.....	11	10	10
Feeling of inadequacy.....	5	5	4
6. Seclusive and fatuous personality.....	15	12	10
II. Due to financial considerations:			
A. Those involving real necessity—			
1. Dependents, kind and number—			
(a) Degree of dependence—			
Partial.....	5	2	4
Entire.....	4		3
(b) Allotments made—			
Class A.....	4		
Class B.....	20		
(c) Insurance.....	52		
2. Prenaval status—			
(a) Skilled.....	25		
(b) Unskilled.....	75		

¹ See curves on appended charts.

Analysis of probable factors involved in the act of desertion—Continued.

	Number found in 100 cases.	Mentally deficient among these.	Neurotics among these.
II. Due to financial considerations—Continued.			
A. Those involving real necessity—Continued.			
3. Desertion status—			
(a) Not employed.....	32		
(b) Casual or unskilled laborer.....	58		
(c) Skilled laborer.....	10		
4. Property interests at stake.....	2		2
B. Those involving fanciful wants—			
1. Desire to accumulate.....	7	3	1
2. Desire to display and vanity, clothes and jewelry.....	8	3	2
3. Desire to imitate others—			
(a) Social spending.....	7	1	3
(b) Amusements.....	6	1	1
III. Due to maladjustments:			
A. To situations involving naval conditions—			
1. Ascribed to conditions denying opportunity for self-betterment:			
(a) In respect to skilled ratings—			
No advancement.....	6	2	1
Could not change rating.....	3	1	1
Could not learn a trade.....	7	1	1
(b) In respect to opportunity to study.....			
(c) In respect to dreary routine.....			
2. Ascribed to conditions denying the spirit of adventure—			
(a) Branch of service deserted from—			
Shore station.....	43		
Transports (including supply ships, colliers, mother ships, tankers, tugs)...	20		
Battleships.....	20		
Cruisers, gunboats.....	7		
Destroyers.....	10		
Submarines.....			
Aeroplanes.....	1		
(b) Had any foreign service.....	28		
(c) Had any sea duty.....	58		
(d) Deserted to get sea duty.....	10	4	7
(e) Made any effort to alter status.....	12	7	10
(f) Participation in any athletics.....	20		
(g) Modes of recreation.....			
3. Ascribed to conditions denying personal volition—			
(a) Revolt at restrictions of choice of action, liberty, etc., and time thereof.....	6	3	3
(b) Revolt at restrictions as to clothing.....	1	1	1
(c) Limited opportunities for saving.....	1	1	1
(d) Limited opportunities for a home; sex instinct denied.....			
B. To situations involving naval practices—			
1. Ascribed to denial of request for leave because of—			
(a) Parental distress—			
Sickness.....	3	2	3
Death.....	1		1
(b) Family distress—			
Sickness.....	2	1	1
Death.....	3	1	3
(c) Financial distress in family.....	8	3	5

Analysis of probable factors involved in the act of desertion—Continued.

	Number found in 100 cases.	Mentally deficient among these.	Neurotics among these.
III. Due to maladjustments—Continued.			
B. To situations involving naval practices—Contd.			
2. Ascribed to inconsiderate treatment, because of—			
(d) Property interest at stake.....	2	.....	2
(e) Accumulation of leave after continuous service.....	3	1	2
2. Ascribed to inconsiderate treatment, because of—			
(a) Hypersensitiveness of recent apprentice..	9	4	7
(b) Overbearing spirit of superiors.....	15	1	4
(c) Restriction of individual's interests in order to maintain a local efficiency.....	4	1	2
(d) Bad ship conditions.....	2	1	1
(e) Denied change of duty.....	7	3	9
3. Ascribed to undue punishment by comparison with—			
(a) Severity in civil life.....	1	.....	.....
(b) Severity in similar naval offenses in others.....	3	.....	1
4. Ascribed to general discontent.....	7	1	2
5. To end enlistment.....	2	1	2
6. No motive but low grade.....	16	5	9
C. Immediate causes of desertion—			
1. Absent over leave.....	37	20	21
2. Influenced by fear.....	11	1	2
3. Influenced by sex.....	9	2	1
4. Influenced by alcohol.....	8	2	3
5. Influenced by "good time" factor.....	11	4	5
6. Uniform stolen.....	2	.....	2
7. Lack of return fare.....	2	2	2
8. Broke arrest or restriction.....	7	2	3
9. To get cured of venereal disease.....	1	1	1
10. Lax discipline.....	1	.....	.....

REFERENCES.

- (1) Army and Navy Register, April 10, 1920.
- (2) Wm. McDougall. Social Psychology.
- (3) H. H. Goddard. Psychology of the Normal and Subnormal.
- (4) L. M. Terman. The Measurement of Intelligence.
- (5) A. W. Stearns. History, a Means of Detecting the Undesirable Candidate for Enlistment, etc. U. S. Naval Bulletin, vol. 12, No. 3.
- (6) A. W. Stearns. History as a Means of Detecting Psychopathic Recruits. Military Surgeon, Vol. XLIII, No. 6.
- (7) W. L. Treadway. Psychiatric Studies of Delinquents. P. IV Public Health Reports, vol. 35, No. 27, July 2, 1920.
- (8) H. H. Goddard. Psychology of the Normal and Subnormal.
- (9) E. E. Southard. The Movement for a Mental Hygiene of Industry. Journal Mental Hygiene, Vol. IV, No. 1.
- (10) T. W. Solmon. Some New Problems for Psychiatric Research in Delinquency. Journal Mental Hygiene, Vol. IV, No. 1.

SOME SURGICAL FAILURES.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

One approaches the discussion of his failures with considerable diffidence. Successes are pleasant to contemplate and give rise to a glow of gratification and we are prone to allow this to overshadow the disappointment caused by our failures. But the successes are sedatives, leading us to belittle the natural forces which have produced the cure and to magnify the importance of the small part that we have played. The failures are powerful irritants, stimulating us to investigate the forces at work, our faulty methods, and the misapplication of our knowledge.

During the first six months of my duty as operating surgeon at the U. S. Naval Hospital, Mare Island, Calif., we have performed over 200 operations, exclusive of such minor procedures as tonsillectomies, rib resection, circumcisions, and operations for varicocoele, ingrowing nails, and deflected nasal septa. Of these, 9 may be considered as definite failures, due to faulty diagnosis or error in operation. The study of the reasons for these failures has been so instructive to me that I believe it worth while to record the cases. Many who read this will say that there was no excuse for these errors, and that anyone with reasonable training and intelligence should have known what was wrong, what should be done, and how to do it. I heartily agree with them.

Case I.

(No. 143.) This man was injured in an explosion on the U. S. S. *Brooklyn* in December, 1918. He had a depressed fracture of the frontal bone over the right eye which kept him in the hospital for three months. He was admitted to this hospital 16 months after his injury. The people with whom he worked stated that for two months past he had been more and more unreliable, forgetful, and inaccurate in his work. His principal complaint was blurring of vision, so he was sent to the eye department.

Examination of the refractive apparatus and eye grounds showed nothing to account for his symptoms. He began to complain of dizziness and headaches, and on the ninth day after admission he vomited. The headache and vomiting increased, he developed a septic temperature, and on the twelfth day he became unconscious. There were involuntary evacuations of the bowels and bladder; reflexes were at first increased and later decreased; the right pupil was dilated and fixed; the left was dilated, but slightly mobile. Spinal puncture showed a clear fluid under increased pressure, but with no organisms.

On the thirteenth day operation was done without general anesthesia. The fibers of the right temporal muscle were separated and a button of bone removed. On incising the dura pus gushed out; about 2 ounces were evacuated and the wound was closed with drainage. He died the same day.

Autopsy showed an abscess originating at the orbital plate at the seat of the old fracture. The right frontal lobe was almost entirely destroyed and there was pus over the surface of the entire right hemisphere.

This history is typical of many cases of brain abscess following injury. Ten years or more may elapse after injury before the abscess appears. In this case the changes in character were noticed before any physical symptoms were mentioned by the patient. When the abscess starts, as this one did, in a blind area, it may reach a considerable size before diagnosis is made possible by localizing signs. Had we been more expert in the field of neurological diagnosis and operated as soon as he was admitted, his chances for recovery would have been much better.

Case II.

(No. 120.) A fireman with hypospadias, the urethra opening just behind the glans.

A small catheter was inserted into the bladder. Two flaps were cut on the mucous surface of the foreskin, about 1 by 1½ inches, with their bases at the urethral opening. These flaps were raised and sewed around the catheter with the raw surface outward. The suturing was very accurately done with very fine gut. A tunnel was then made through the head of the penis to its tip and the outer end of the catheter, with the flaps sewed around it, brought through the tunnel. This formed a new urethra lined with epithelium and opening at its proper place. The raw surfaces from which the flaps had been raised were sutured together to make a more normal foreskin. The catheter was left in the bladder to provide drainage and prevent soiling of the wound with urine.

Up to the third day the parts were clean and apparently healing well. On this day the catheter came out and the patient replaced it himself. Infection of the parts followed and the wall of the tunnel through the head of the penis sloughed away, leaving the condition after healing about the same as before operation.

I believe this operation would have been successful if the catheter had been stitched in place at the time of operation and retained until about the sixth day. The blood supply is so rich here that healing is rapid and the resistance to infection is high. The catheter must be large enough to prevent the leakage of urine around it and

small enough not to make too much pressure where it is drawn through the tunnel in the head of the penis. The small catheter will lead to infection and the large one to necrosis of the wall of the tunnel.

CASE III.

(No. 31.) Three years ago he fractured the left patella. On admission there was cartilaginous union with the fragments separated about three-quarters of an inch and the upper fragment tilted. He complained of weakness and loss of confidence in the leg.

Operation was done using the Lane bone technique. The cartilage was cut out, the bone surfaces freshened and approximated. Holes were drilled and heavy kangaroo tendon threaded through to hold the fragments in position. The capsule was closed with one layer of mattress and one layer of continuous sutures of heavy chromic gut. The incision was closed without drainage and a posterior straight splint was applied.

Ten days after operation an X-ray picture showed one-half inch separation between the parts. Healing was uneventful, but the final condition was the same as before operation.

Failure in this case was due to the fact that the kangaroo tendon did not hold the parts together. We are told that kangaroo tendon will last 40 days before absorption begins, but in this case it did not do so. Silver wire should have been used as suture material, or, what is better, a dovetailed bone graft should have been used. The more I see of the results of bone grafts and of fixation by non-absorbable wires or plates, the more strongly I favor the bone graft.

Case IV.

(No. 113.) Recent fracture of the right clavicle, one-half inch from the sternal end with downward displacement of the outer fragment. Efforts to hold the parts in position by dressings were unsuccessful, so operation was done. Holes were drilled in the two fragments and heavy kangaroo tendon was inserted to keep the ends in apposition. A Velpeau dressing was applied.

A week after the operation the patient developed influenza, then pneumonia, and later empyema. On the 16th day after operation it was necessary to remove all dressings, as they interfered with respiration. At this time the incision was well healed and there was beginning union of the fracture with the parts in good position. Two days later the outer fragment was found to be displaced downward and inward, with its sharp end just under the skin. Six weeks later he had developed tuberculosis in both lungs. At present, three months after operation, this deformity persists, and it has

been found impossible to retain the parts in proper position by any dressing. If his general condition improves, we hope to repair the fracture again, under local anesthesia.

Here, again, the failure was due to the fact that the kangaroo tendon was not sufficient to hold the parts after removal of the dressing became necessary. The mesial fragment was not large or strong enough to justify a bone graft, but I believe that silver-wire sutures would have insured a good result.

Case V.

(No. 71.) Seven months before entering the hospital the patient sustained a T-fracture of the lower end of the left humerus. Several efforts had been made to break up the resulting adhesions under anesthesia, but without permanent benefit. On admission he had only about 10° of motion in the joint between the 100° and 110° positions. A radiogram showed some filling of the olecranon fossa and thickening of the joint surfaces of both condyles of the humerus. There were also dense fibrous adhesions.

Operation was decided upon. An incision was made to the outer side of the olecranon and the joint exposed. The thickening of the condyles was chiseled away and the olecranon fossa cleared. Flaps of fascia were turned in to cover the raw surfaces. The incision was closed and an anterior incision made. Dense fibrous bands were found in the capsule, preventing extension. These were broken by forcible extension and the incision closed. Full extension and flexion were then possible.

Two weeks after operation the condition was the same as before operation. Daily motion had not been carried out as ordered.

Two months later an orthopedic specialist saw the case with us. He called attention to evidences of arthritis and recommended examination of the teeth and tonsils as possible sources of focal infection. He did not recommend further operation. A chronic alveolar abscess was found and treated and the tonsils were removed.

In this case all possible sources of focal infection should have been removed first. Two courses were then open—operation or graduated movement. The operation was probably all right as far as we went, but the fibrous bands in the front of the joint should have been cut through, separated, and a flap of fascia sewed in to fill the hiatus. Forcible stretching of such dense adhesions leads only to greater scar formation and further contraction. Daily active motion of the joint should have been rigidly enforced. I believe that the best treatment would have been forcible flexion under anesthesia and fixation in extreme flexion for two weeks; then gradual extension by weight bearing, such as carrying a bucket with increasing

amounts of water in it, should have been started and carried out over a period of several months.

Case VI.

(No. 121.) A workman, aged 45, of poor physique. He had always done clerical work until the war, since when he had worked in the navy yard. A rupture occurred while lifting a heavy weight. Examination showed, on each side, a large, relaxed external inguinal ring with impulse over a large area.

Operation showed very poor tissues on both sides, with the conjoined tendon attached to the rectus sheath about an inch above the pubes instead of to the pubes itself. There was a large space without support external to the rectus and a definite hernia protruding through a slit in the conjoined tendon, the latter structure being about as thick as a sheet of paper. There was no sac at the internal ring. A large mass of fat at the external ring was removed and the sac infolded by a series of mattress sutures of chromic gut. The opening in the conjoined tendon was closed by chromic gut suture, and in sewing the conjoined tendon down to Poupart's ligament the sutures passed through each side of this opening for further reinforcement. Both the conjoined tendon and the aponeurosis of the external oblique were sewed to Poupart's ligament under the cord. The internal oblique was sewed to Poupart's ligament also by one suture above the new internal ring.

Three weeks after operation there was a distinct protuberance with impulse on coughing, above and to the outer side of the internal ring on the right side.

I believe there was no possibility of a sac at the internal ring which we failed to find. The old hernial openings being closed, the weakest spot gave way when the abdominal pressure was sufficiently raised. The location of this weakest spot is of interest. Masson (Collected Papers of the Mayo Clinic, Vol. X, p. 997 et seq.) says: "The hernias that are particularly difficult to cure are those, either direct or indirect, that are associated with a poorly developed internal oblique muscle, and this type can always be determined by a digital examination through the external abdominal ring. The normally developed internal oblique and conjoined tendon, when it is present, can readily be felt, and the distance between these structures and Poupart's ligament accurately estimated. * * * In the worst cases no resistance is encountered until the edge of the rectus is reached." The case here described is of this type. Masson also says that "Any type of operation is satisfactory on children and young adults, but for older persons every precaution should be

taken and the strongest possible closure made." Two possible ways of making a stronger closure in this case would have been to split the posterior surface of the rectus sheath and sew it down to Poupart's ligament over the open space and to sew the internal oblique and the aponeurosis to Poupart's ligament above the new internal ring as far up toward the anterior superior spine as possible.

Case VII.

(No. 115.) Admitted to this hospital from another station 10 days after his illness began. The health record stated that he had an initial chill, general pains, fever of 104° , and 30,000 leucocytes. After a few days he felt better but his abdomen began to swell and he had diarrhea, but no abdominal pain at any time.

On admission there was general enlargement of the abdomen; tympany in the midline with dullness in both flanks, more marked in the left than the right; no localized tenderness; moderate pain in the left side of the abdomen; no localized rigidity; temperature 101.6° ; leucocytes 21,000 with 81 per cent polymorphonuclears. He said he felt very comfortable. A tentative diagnosis of tuberculosis of the peritoneum was made. He was placed in a semiupright position; given water and nourishment by rectum, nothing by mouth, and large hot turpentine stupes were applied over the whole abdomen.

His condition improved steadily and on the sixth day his temperature was normal and he felt very well. A radiogram showed generalized tuberculosis of both lungs. The seventh day he felt worse; abdominal distension returned, and he became very septic. The eighth day he was much worse and operation was done. On opening the peritoneum pus gushed out and about 2,000 c. c. were evacuated. No effort was made to locate the source of the pus and no manipulation was done. A drain was inserted and the wound closed. He died about 12 hours after operation. Autopsy showed a gangrenous appendix rotted off at its base and general peritonitis.

A reconstruction of the history, based on the conditions found at autopsy, indicated a fulminating, gangrenous appendicitis with early rupture; a slowly spreading peritonitis with constant efforts to wall off the process, which were finally successful; improvement for a time and then sudden breaking down of the protective barriers and an overwhelming invasion of the whole peritoneum.

The failure in this case was in the diagnosis. Tubercular peritonitis is sometimes rapid in progress, as in this case, while peritonitis following appendicitis is usually more rapid and with more localizing symptoms. The leucocytes were higher than commonly seen in peritoneal tuberculosis, but the per cent of polymorphonuclears was less than that usually seen in peritonitis due to the *Bacillus coli* or a pus organism.

The treatment would have been the same if the correct diagnosis had been made. The advisability of operation at the time he entered the hospital might be debatable, but after the patient had fought the infection so successfully for 10 days I should not have interfered. The operation that we did do was unnecessary and useless. It made no difference in the outcome.

Case VIII.

(No. 3.) He was admitted a week ago with acute tonsillitis, but that has now subsided.

First day. Acute pain in the abdomen after eating a piece of melon. He was given castor oil and immediately vomited. When first seen by me, at noon, the belly was rigid and board like throughout, but not distended; there was pain on being touched anywhere on the abdomen, but no points of localization or excessive tenderness. The face was congested; he had severe headache and pain in the back of the neck; the tendon reflexes were increased. The temperature, which was normal in the morning, was 105° at noon; the pulse was 103 and the leucocytes 15,000, with 87 per cent of polymorphonuclears. The glands of the neck were swollen and tender; the tonsils and throat showed no inflammation. An enema produced an evacuation of considerable fecal matter and made him comfortable.

Second day. Temperature, pulse, and respiration were normal. The belly was still rigid throughout, without distension. No abdominal facies, but rather the congested face of a general infection. Operation was decided upon, with the preoperative diagnosis of appendicitis in the "fools' paradise" stage.¹ On opening the peritoneum it was found generally congested and there was a considerable amount of bloody serous fluid. The general picture was distinctly that of general peritonitis due to the streptococcus and not to a pus-producing organism. The terminal inch of the appendix was swollen and contained pus. The basal portion of the appendix and the cecum showed the same turgidity as the whole peritoneal surface. The appendix was removed and the abdomen closed. Twelve hours after operation he felt very well, but from that time on he showed increasing evidence of a general septicemia, and died on the fourth day of his illness. A blood culture, taken before operation, showed the *Streptococcus hemolyticus* in pure culture.

The two diagnoses most seriously considered were cerebro-spinal fever, which was epidemic, and appendicitis, because of the frequent occurrence of appendicitis as a sequel to tonsillitis. It was possible to exclude cerebro-spinal fever by the absence of many signs. Against appendicitis of the ordinary type was the sharp rise of temperature

¹ See U. S. Naval Medical Bulletin, Vol. VIII, No. 2, April, 1914, page 310.

to 105° and the absence of localizing symptoms. The appendicitis which did exist was a minor manifestation of the severe general infection and in no way affected the outcome. Had the report on the blood culture come two hours earlier it would have made the whole process clear and prevented the operative interference. I believe that by operation we reduced his already slight chances of recovery. The appearance of a streptococcus peritonitis is so different from that of a peritonitis produced by an essentially pus-producing organism that it should have been recognized at once on opening the abdomen.

Case IX.

(No. 59.) This man fell about 10 feet through a hatch, landing astride a beam with a large projecting spike which was forced about 4 inches into his rectum. About four hours after being injured he reached the hospital and, at that time, he complained of severe general abdominal pain. The abdomen was rigid, not distended or tympanitic. The temperature was 102°. There was no evidence of hemorrhage and he passed urine voluntarily, which was free from blood. He refused to permit operation or even rectal examination as this had been done several times before he reached the hospital and his rectum was very sore. A note by the medical officer of the ship was to the effect that rectal examination showed no injury.

The second day the temperature was 102°; he had severe abdominal pain and the distention and tympany were greatly increased. He consented to operation. A midline incision below the umbilicus was made. The large intestine was distended, but there was no obstruction. The pelvic colon showed two dusky-red spots low down on its wall, each about the size of a silver dollar. These were not different enough in color from the normal bowel wall to lead us to interfere with them. A drain was inserted down to the pelvic colon and the incision closed. A rectal examination was then made and it disclosed a tear extending halfway around the bowel just above the internal sphincter. In the cellular tissue outside the rectum were found large fecal masses and two pieces of the patient's clothing. A large rubber tube was inserted into the rectum past the tear and gauze was packed around the tube to prevent further contamination by escape of feces.

For several days his condition improved, then general peritonitis came on suddenly and he died 10 days after his injury. Autopsy showed a general peritonitis with feces free in the peritoneal cavity. The two dusky-red areas in the wall of the pelvic colon had necrosed and dropped out, allowing the bowel contents to escape.

The initial mistake was in accepting the statement of the medical officer who first examined him that there was no injury to the rectum. But the important mistake was in not resecting the discolored areas of the bowel wall at the time they were discovered. In this connection, Hertzler¹ says, "This event is most likely to occur in cases in which the violence of the injury was not extreme. The injured area becomes necrotic, the result of thromboses, and drops out, permitting the contents of the gut to escape, with the usual results. These are very treacherous cases." He also describes a somewhat similar case in which an area the size of a dime had dropped out of the wall of the colon about a week after a slight injury.

CIRCUMCISION.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

The little things a man does form the basis of his reputation. His great achievements bulk larger in his own mind, but only a few know of them or are able properly to evaluate them. His every-day acts are known and judged by everybody and on this foundation his reputation is built. Thus the naval surgeon is judged not by his few gastroenterostomies or difficult bone operations but by his circumcisions, by his success in removing warts, and by the results of his operations on ingrowing toenails. Circumcision, especially on board ship and at small stations, can be employed to build up the reputation of the Medical Department; to maintain the manual dexterity of the medical officer and, most important of all, it can be of great aid in training the hospital corpsmen. This last is, to the Medical Corps, its most important problem in postwar reconstruction.

When on board ship I have been accustomed to set apart two periods each week in the regular time of Hospital Corps instruction for circumcisions. The material available has been limited only by the number of young men on the ship and we have always had a waiting list of candidates. Each patient was informed that he would not be placed on the sick list after operation, but would be required to perform his duties as usual. I believe this is important, not only to avoid interfering with the ship's routine but also in lessening erotism and favoring rapid healing. When a man is relieved of his duties and has nothing to do, his thoughts center on the injured member, which responds by congestion, erection, and excessive tension on the sutures, all of which are unfavorable to clean and rapid healing. When the patient continues his regular occupation his mind is on things not related to sex, and when he finishes his day's work he is tired enough to sleep soundly. The patients never com-

¹ *The Peritoneum*, Vol. II, p. 635.

plained of excessive discomfort, and I never saw any bad results from this system. Each man was required to bring a note from his division officer to the effect that the man could be spared from his work for the operation.

On circumcision days the operating room was rigged as for a major operation and opportunity was taken to instruct the hospital corpsmen in preparation and sterilization of dressings, care of instruments, preparation and use of sutures. They took the various operating-room stations in rotation on different days. The operative field was prepared and draped with great care, for few operative fields are more difficult to prepare aseptically than this. One of the hospital corpsmen acted as assistant to the operator, and after he had assisted at several of these operations and appeared to be competent he was allowed to do the operation while the medical officer acted as his assistant.

The benefits of this routine were several. The hospital corpsmen were trained in operating-room technique in the most interesting way. Everything was ready and the personnel trained for any surgical emergency. The medical officer maintained and increased his manual dexterity. It established a contact with the crew which increased their confidence in the medical department.

The method of circumcision was chosen not because it was quick and easy, but because it gave the best cosmetic and functional results and afforded the best training for the assistants. It is recommended to those who have no favorite operation. Anesthesia is secured usually by injections of one per cent apothesine solution. No tourniquet is used. The end of the prepuce is seized with four mosquito hemostats placed equidistant from each other. Locate on the skin a line that, without traction, comes about one-fourth inch distal to the corona. Pull on the hemostats so that this line is safely beyond the glans. With a very sharp scalpel cut on this line all the way around, through the skin only. If this is properly done the vessels, four to eight in number, can be seen in the areolar tissue where the skin retracts. Each of these vessels is clamped with a fine hemostat. This makes the operation practically bloodless. The mucous membrane is now cut through about three-eighths of an inch from the corona all the way around. The vessels are tied with No. 00 plain gut. With No. 1 plain gut a mattress suture is taken at the frenum and tied with the knot on the skin side. A stitch is taken just opposite the frenum and one on each side. After tying, the ends of these are left uncut. As many stitches are now taken as are necessary to bring the cut edges into accurate apposition. A piece of one-inch gauze bandage is smeared with sterile vaseline, wrapped loosely around the suture line and tied in place with the ends of the first four sutures which were left long for this purpose.

A small gauze dressing is applied. The vaseline protects the wound from contamination by the urine and the vaseline dressing is left until it drops off, about the sixth day, when healing should be practically complete.

No originality is claimed for this operation. It is simply a combination of several classical methods. Its proper use will make circumcision a successful plastic operation instead of a messy job.

THE USE OF A GLUE CAST IN FRACTURES OF THE EXTREMITIES.

By H. R. COLEMAN, Lieutenant, Medical Corps, United States Navy.

The convalescence of patients suffering from fracture of one or both bones of forearm or leg is always lengthened by the atrophy of disuse and loss of active motion limits, resultant from the application of appliances which restrict or impede the active motion of that portion of the limb until bony union is well enough established to assure the removal of those appliances without endangering the unprotected limb to secondary fracture.

The most accepted types of immobilization in fractures of forearm or leg are the plaster cast and Hodgen's traction suspension splint, the choice of apparatus depending on the type and site of fracture and the bones involved.

In the case of simple fracture of one or both bones of forearm or leg there is usually fairly firm fibrous union by the fifteenth day. Up to this time these fractures are doubtless best immobilized by plaster casts. After this period, however, the ideal dressing is one which will not only hold the uniting bones in firm alignment and position and protect them from direct violence but also allow of free active motion of the injured portion of the limb as an entirety. To permit this freedom of motion several types of splints and casts have been tried in an effort to find a dressing which would do away with the plaster cast and the unwieldiness occasioned by its weight.

While on duty at the U. S. Navy Base Hospital No. 5, Brest, France, I was afforded the opportunity of observing and using glue strips in securing traction with Hodgen's splint apparatus. The formula for the glue mixture used was:

	Parts.
Cabinetmaker's glue	50
Water	50
Glycerin	2
Sodium carbonate	2

The above is heated in a water bath until the flake glue is dissolved. It is then allowed to cool to body temperature and applied with an ordinary paint brush. Six hours after application these glue strips

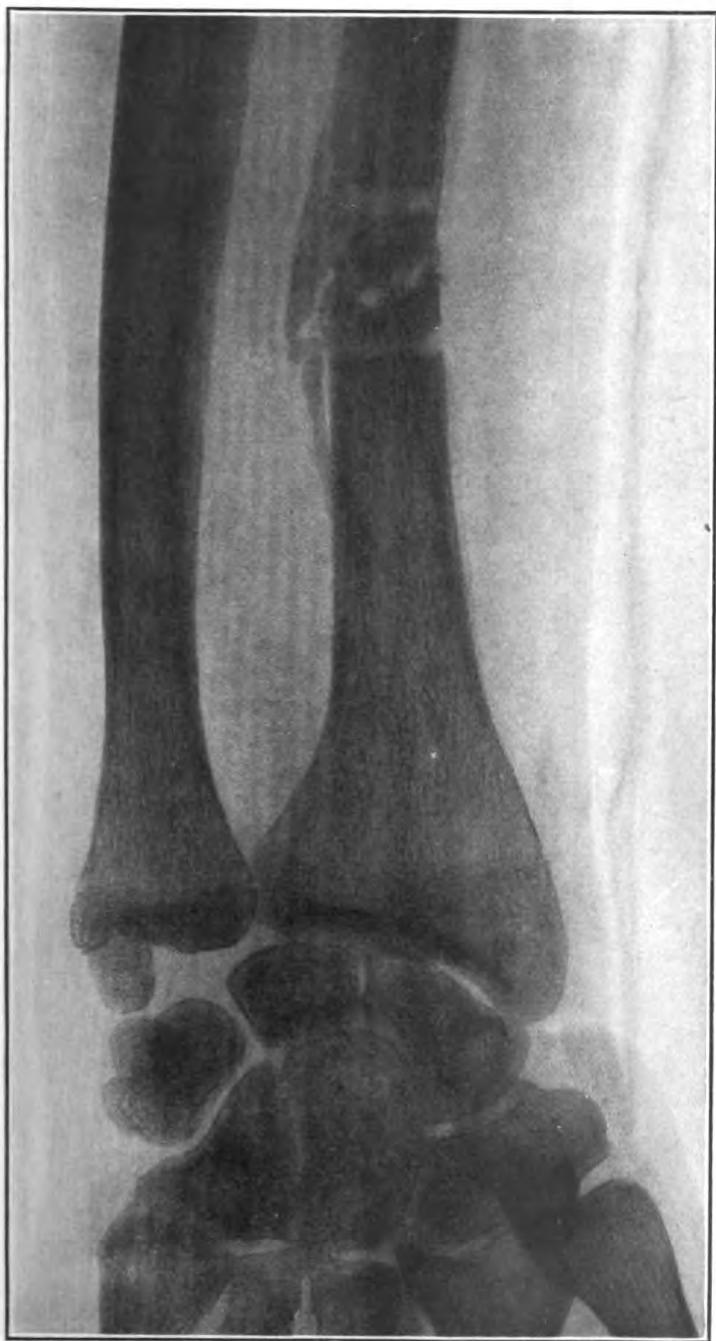
become hard, stiff, and resilient, and having read of several types of glue casts we decided to try this form of glue in the construction of such a splint.

Our first case was that of a simple Colles's fracture. Twelve days after injury the plaster cast was removed and the arm and hand cleaned. A spiral gauze bandage was applied extending from the metacarpo-phalangeal articulation to within 3 inches of the elbow. This was painted and a second layer of bandage applied, which was in turn painted until four alternate layers of bandage and glue had been applied. The arm was kept immobilized with sand bags for six hours by which time the glue was dry and firm. A radiograph, three days later, showed the fracture in its original position and alignment. The cast afforded practically no absorption to the ray. The patient was not required to carry his arm in a sling and at once began using that hand in eating, dressing, etc. Four weeks after application the cast was removed. There was practically no atrophy of the muscles of the forearm, and the limits of active motion of elbow and fingers were practically normal. There were, however, two small spots of pressure necrosis where the bandage was reversed, and several small excoriations where the cast stuck to the skin.

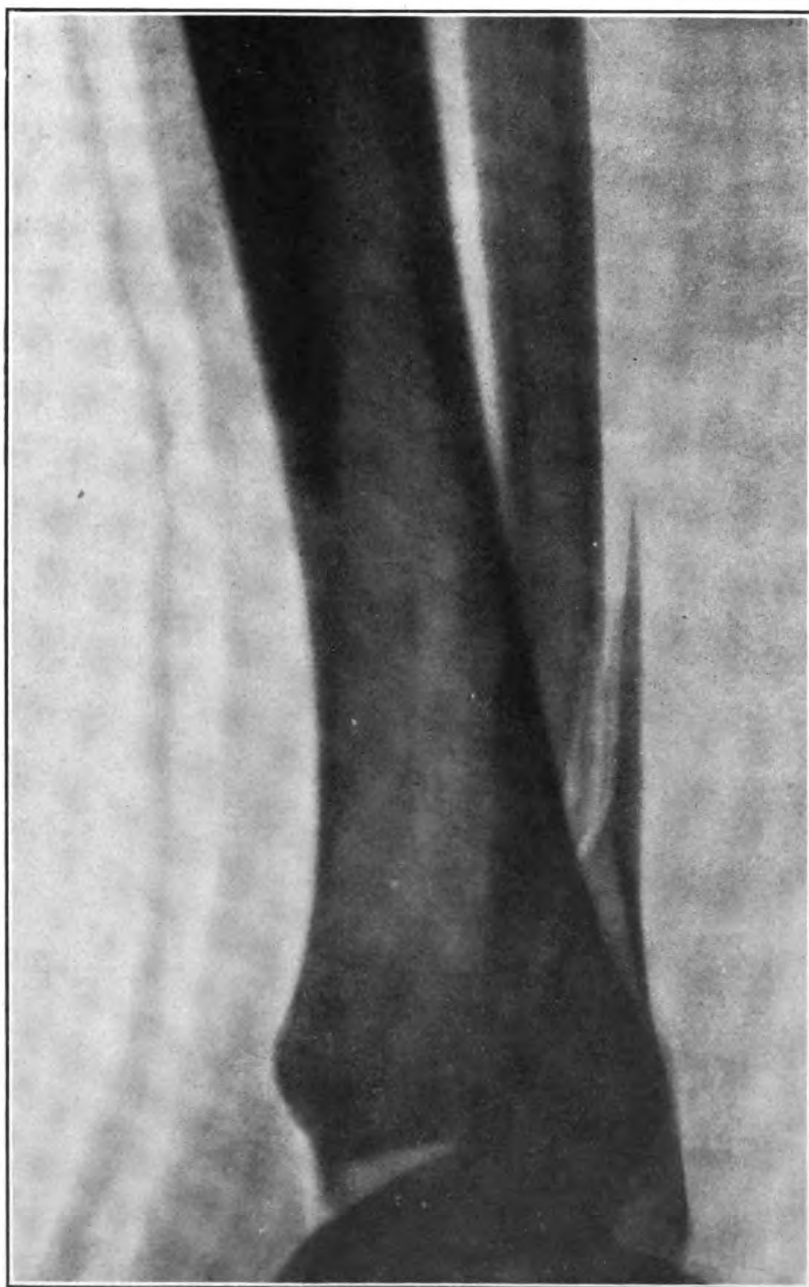
Our second case was also a simple Colles's. The plaster cast was removed on the twelfth day, the arm wrapped with one layer of sheet wadding, and the glue cast applied as in case 1. Ten days after application the patient was caught in the rain while on liberty, and the case softened; it was removed and a second cast applied. Twenty-four hours after application the outer surface was shellacked. At the time of removal, some three weeks later, this cast was impervious to water. We found, however, that our sheet wadding had become wrinkled and showed a tendency to wear and bunch up about the styloid process. Also there were several places where the glue had permeated the sheet wadding, forming hard spots which caused some discomfort and skin irritation.

It was evident from the above that we would have to find another padding and some way of keeping our glue from permeating that padding. After some experimentation we adopted the following:

The arm is cleaned and two layers of lint bandage applied (spiral reverse). This is covered with a layer of oiled-paper bandage, over which the cast proper is applied, using three alternating layers of glue and gauze bandage. It takes about 20 minutes to apply such a cast, and by placing the part in the path of an electric fan it becomes firm in 3 hours and dry and hard in 24, at which time one coat of shellac is applied. This cast when complete weighs between 3 and 4 ounces. The lint gauze forms an excellent padding. The oil paper



Fracture, right radius. Glue cast applied two weeks after injury.



Simple fracture, left fibula. Glue cast applied two days after injury.

is not permeated by the glue, and the patients find it a very comfortable dressing.

It has been our experience that the glue cast is not a suitable dressing for early immobilization unless the case is one of simple fracture of the fibula with fragments in good position, because of the length of hardening time. It does, however, appear to be an excellent splint for application as soon as union is firm enough to prevent any displacement during this hardening time. Its extremely light weight allows of and encourages active motion of the injured part. It affords sufficient protection against both direct and indirect violence. It permits of excellent bone detail in fluoroscopy and radiography without the ray absorption one gets with other splints.

A PLEA FOR THE MORE FREQUENT UTILIZATION OF THE SUBCUTANEOUS TUBERCULIN TEST AS AN AID TO THE EARLY DIAGNOSIS OF TUBERCULOSIS.

By G. A. GRAY, Lieutenant, Medical Corps, United States Navy.

The subcutaneous tuberculin reaction as a diagnostic agent, while not a new procedure, is not used as generally by the profession as it should be. Frequently it is confused with the more widely known, although practically worthless test in adults, Von Pirquet tuberculin test. During the past winter the subcutaneous tuberculin test was not in general use at the U. S. Naval Hospital, Mare Island, Calif., as most of the medical officers having had very little experience with the reaction had no particular faith in its results.

The laboratory, therefore, in conjunction with Lieutenant Commander M. C. Baker, chief of the medical service of the hospital, and Lieutenants E. R. Guinan, J. J. Sale, and L. E. Smith, ward officers, attempted to run a series of subcutaneous tuberculin tests in an effort to demonstrate its efficacy as a diagnostic agent. Along with a number of definite tuberculosis suspects, a series of tests were conducted upon apparently normal individuals from the surgical wards, and used as controls. All of the individuals used in the series were thoroughly studied. Repeated sputum examinations were performed (antiformin method). Careful physical examinations were made and histories taken. Stereoscopic chest plates were made and a report with probable diagnosis received from the roentgenologist.

The technique of the test is very simple and directions may be secured from any biological manufacturing house. We proceeded as follows: The suspected individual is placed in bed for a period of 48 hours before he receives the first inoculation consisting of one-fifth of a milligram of Old Tuberculin. (The O. T. may be secured

in the required dilutions or in the undiluted form from any biological manufacturing house.) The patient has his temperature, pulse rate, and respiration rate taken every four hours during this period, so that one may have a standard to go by for normal. The injection is given subcutaneously during the late afternoon, and the patient's temperature, pulse rate, and respiration rate are recorded as before. It is very important that his symptoms be recorded following the inoculation. Three points are then watched for: (1) Local reaction at the site of the inoculation, consisting of an inflamed, indurated, swollen, or tender area; (2) general or constitutional reaction, consisting of an increase in temperature, pulse or respiration rate, with possible malaise, dizziness, nausea, headache, backache, chill, or restlessness, etc.; (3) focal reaction, as determined by an increased pain or ache over the suspected focus, râles, cough, hemoptysis, etc. If at the end of 48 hours from the time of the injection of the one-fifth of a milligram of O. T. no definite reaction, as enumerated above, was noted, a second inoculation, this time consisting of 1 milligram of O. T. is given and the case studied as after the first inoculation. If still there is no definite reaction obtained in from 48 to 72 hours more, a third and final inoculation consisting of 5 milligrams is made. Usually it requires the three injections of tuberculin before a case can be said to be definitely negative.

In our series at this hospital we noted that a number of individuals complained of slight headache or dizziness after the first injection, but showed neither local or focal symptoms and gave no increased pulse or respiratory rate and showed no elevation of temperature. A few others merely had a slight local reaction after the first injection. Upon giving them the second and third amounts of tuberculin with absolutely no symptoms or findings following the injections, the slight reaction was considered to be a pseudoreaction and due simply to a hypersensitiveness to the tuberculin, and not to the fact that they were harboring an active process of tuberculosis. All such individuals giving the slight reaction after the first quantity of tuberculin and having purely a negative response to the second and third dilutions were considered in our series as being negative for tuberculosis. Patients with frank findings of active tuberculosis, positive sputum findings, or cases of suspected tubercular meningitis should not be subjected to the test, as the resulting reactions are very severe and frequently dangerous to the subject.

The following table presents the results of our work. The advantages of using the test as an aid to diagnosis are quite apparent.

Case.	Tubercu- lin reac- tion.	Tubercle bacilli demonstrated in sputum.	X-ray findings of tuber- culosis.	Physical findings of tuber- culosis.	Tubercu- losis. history.
1...	+	+ ¹	+	?	+
2...	-	-	-	-	• -
3...	+	-	+	+	+
4...	+	+ ²	+	+	+
5...	+	+ ²	+	+	+
6...	+	+ ³	-	?	-
7...	-	-	?	?	?
8...	+	+ ⁴	+	?	+
9...	+	+ ⁵	+	+	+
10...	+	-	+	+	+
11...	+	-	?	?	?
12...	-	-	-	?	-
13...	+	+ ⁶	-	+	?
14...	-	-	-	-	-
15...	+	+	?	+	+
16...	-	-	-	-	-
17...	-	-	-	?	-
18...	-	-	-	-	-
19...	-	-	-	-	-
20...	-	-	-	-	?
21...	+	+ ⁶	+	+	+
22...	+	+ ⁷	+	+	+
23...	+	+ ⁴	+	+	+
24...	-	-	-	-	-
25...	-	-	-	-	-
26...	-	-	-	-	-
27...	-	-	-	-	-
28...	-	-	-	-	-
29...	-	-	-	-	-
30...	+	-	+	+	-
31...	-	-	-	?	?
32...	+	-	+	+	?
33...	-	-	-	-	-
34...	-	-	-	-	-
35...	-	-	-	-	-
36...	-	-	-	-	-
37...	-	-	-	-	-
38...	-	-	-	-	-
39...	-	-	-	-	-
40...	+	-	+	+	-
41...	-	-	?	?	-
42...	+	-	?	?	+
43...	-	-	-	?	+
44...	+	-	?	?	-
45...	+	-	+	+	-
46...	+	-	-	-	-
47...	-	-	?	?	?
48...	+	-	-	-	-
49...	-	-	?	?	-
50...	+	-	?	?	-

(+) represents positive; (-) represents negative; (?) represents doubtful.

¹ 3 weeks later.

⁴ 10 days later.

⁶ 2 weeks later.

² Same week.

⁴ 4 to 5 weeks later.

⁷ History of positive sputum.

¹ 1 week later.

Twenty-three positive reactions were obtained out of 30 patients giving either positive or doubtful findings as regards history, X-ray, or physical signs. Ten of these positive cases later gave sputa hav-

ing demonstrable tubercle bacilli in them. During the first part of our series our positive reactions were not readily accepted until we later demonstrated the tubercle bacilli present in 7 of these individuals. The 3 remaining cases showing tubercle bacilli in their sputa occurred while they were awaiting transportation after having been passed upon by the board of survey. The subcutaneous tuberculin test is now a routine procedure at this hospital in all cases of suspected tuberculosis.

DIPHTHERIA AT MARE ISLAND, CALIF., IN 1920.

By G. A. GRAY, Lieutenant, Medical Corps, United States Navy.

During the month of March of the present year we had at the U. S. Naval Hospital, Mare Island, Calif., what might be termed a mild epidemic of diphtheria. Twenty-two cases were admitted in February, 50 in March, and 23 in April. About 25 of the admissions in March came as tonsillitis or as suspects for diphtheria with a diagnosis undetermined, while the remaining 50 per cent of the diphtheria cases in March developed in the various hospital wards. A large portion of these latter cases were in hospital corpsmen on duty in the wards. At this time nose as well as throat cultures were taken on all cases and the nose cultures increased our positive findings of the Klebs-Loeffler bacilli just 100 per cent.

When a new case of diphtheria developed in any of the hospital wards routine nose and throat cultures and Schick tests were made on all contacts of that case. A total of 56 carriers was found following this procedure, and they were immediately transferred to an isolation ward for treatment unless their physical condition (emphyema) contraindicated their removal. In the latter case they were placed in cubical isolation and treated. When a case of diphtheria developed on a ship in the yard and the medical officer requested it, the laboratory made nose and throat cultures on the entire personnel. On one ship in particular a virulent carrier was obtained by this method, and although two cases had developed there previous to finding this carrier, no new cases were reported following his removal to the hospital for treatment.

All individuals in the hospital showing positive Schick reactions were immediately given 1,000 units of diphtheria antitoxin. This immunization was supplemented by a course of toxin-antitoxin inoculations in all the patients who remained in the hospital for a sufficient period of time. No patients who had Schick tests performed on them and received an indicated immunization came down with diphtheria. Carriers invariably gave negative Schick reactions.

We were able to check up on only 16 cases that had had positive Schick reactions, had received an immunizing dose of antitoxin, and had taken a course of toxin-antitoxin (3 injections of 1 c.c. each of the serum at 5 to 7-day intervals). We gave these individuals their second Schick test 10 weeks after they had received their final injection of toxin-antitoxin. Thirteen of these reactions were negative this time, two were pseudoreactions, and one was still a positive. In the latter case his original Schick reaction was a very marked one, while his second test, although still a positive reaction, was of less intensity than his former one. The medical officers in charge of the wards found that they had the best therapeutic results when they gave early and large initial injections of antitoxin, single doses of from 20,000 to 30,000 units being sufficient in most cases. During the epidemic the laboratory force took 4,706 cultures, made 298 Schick tests, gave 78 injections of immunizing doses of antitoxin, and 237 inoculations of toxin-antitoxin mixture, and performed 20 virulency tests on carriers. Two cases of death from diphtheria occurred in empyema patients; four complicated bronchopneumonia. At autopsy they showed marked adrenal involvement. Macroscopically the adrenals were a deep bronze color, slightly enlarged, and markedly congested. Microscopically the glands showed extreme congestion and hemorrhage. We have had two cases of post-diphtheritic paralysis, one of whom died of myocardial failure. During the three months mentioned above we had 11 deaths due to diphtheria.

The longest period a carrier was treated before he ran three negative cultures at 48-hour intervals was three months. Various methods of treatment were resorted to, including applications of local antiseptics and antitoxin and the injection of diphtheria bacterin. Four carriers, it was thought, yielded to the bacterin treatment, although they received the local applications of antitoxin simultaneously. Everything taken into consideration, it was thought that the best results were obtained when antitoxin was thoroughly applied to the nasal and pharyngeal surfaces t. i. d. Changing from the use of antiseptics locally to antitoxin and vice versa seemed to be beneficial in a few resistant cases. We found that practically all of our carriers following clinical diphtheria yielded to treatment far more readily than the carriers we picked up in the various hospital wards through our routine culturing. We performed 20 virulency tests on various carriers. Out of 16 carriers (not clinical cases) who were very stubborn to all treatment, we found that 8 were harboring virulent and 8 avirulent organisms. No matter how mild a clinical case had been, the organisms present throughout the carrier stage were always found to be virulent.

AGGLUTINATION OF HUMAN ERYTHROCYTES BY VARIOUS THERAPEUTIC SERA.

By G. A. GRAY, Lieutenant, Medical Corps, and E. C. UPP, Pharmacist's Mate, Third Class, United States Navy. /

From our position in the laboratory at the U. S. Naval Hospital, Mare Island, Calif., the past few months, we have had an opportunity to be of aid to the various ward officers on both the medical and surgical services. As a result we have been called upon to type donors and perform blood transfusions in the surgical cases, to lend a hand in the diagnosis of conditions, and to aid in the serum therapy of the medical patients.

Last winter, while working with seven cases of cerebro-spinal meningitis, we observed, with the ward officer, that, following an intravenous administration of antimenigococcus serum, in three cases a very definite and severe reaction occurred in the patients. This reaction may have been nothing more than a protein shock reaction or an anaphylactic reaction; but at all events it seemed to have a very definite relation to the death of two of the individuals. As a result of these reactions the next four cases were given the antimenigococcus serum by intrathecal administration only, and they went on to uneventful, slow recoveries. One case of meningitis due to a short-chain streptococcus went on to a recovery following both the intravenous and the intrathecal administrations of antistreptococcus serum, with no shock reactions other than a slight chill. A second example of streptococcus meningitis, due to an extension from an acute mastoiditis, rapidly succumbed to the disease, although a slight temporary improvement followed the first intravenous and intrathecal administrations of antistreptococcus serum. No shock reaction followed the serum administrations in this case.

One patient suffering from a severe toxemia in a diphtheria infection was treated by an intravenous injection of diphtheria antitoxin with a resultant very violent shock reaction. An uneventful recovery followed.

On the surgical service we were called upon to transfuse an individual with a marked surgical and secondary anemia. Previous to this he had had a streptococcic infection of his compound fracture wound, and had been given a thorough course of antistreptococcus serum, both intravenously and subcutaneously, with no marked shock reactions occurring. Later he developed a diphtheritic infection of his wound and received diphtheria antitoxin both locally and subcutaneously with no resultant protein or serum reactions. In attempting to select a suitable donor for the transfusion for this patient, we were unable to find a perfect match out of the 10 available donors at hand. We were finally forced to select a Type IV donor, whose cells showed only a slight degree of agglutination with the recipient's serum. We used a suspension of these cells in normal

saline for the procedure of transfusion. Following this intravenous administration the patient underwent a violent chill, with marked cyanosis, dyspnea, and feeble pulse. Intravenous administration of 1 c. c. of a 1-1000 adrenalin chloride solution at hourly intervals with the application of external heat, was followed in about an hour and a half by a profuse perspiration. From then on the patient was quite comfortable. He picked up fairly rapidly from that date and is now convalescing at his home.

The above-mentioned reactions following the intravenous administration of therapeutic sera, along with the reaction following the transfusion of poorly matched blood cells made us interested as to the possible causes of these reactions. The question then arose: Were these reactions merely an anaphylaxis, a protein shock reaction, or were they due to an agglutination of the corpuscles in vivo as a result of the presence of agglutinins or some such substance in the serum? It might be argued by some that the benefit in the transfusion mentioned above was due more to the administration of a foreign protein than to the new corpuscles, as such. We inferred from the statement by McGuire and Redden (*Jour. Am. Med. Assn.*, Nov. 23, 1918, p. 1765), that a possible agglutination of the corpuscles was a negligible factor, as they had decided to discontinue the incompatibility test of donor's serum with the recipient's corpuscles, in using pooled convalescent influenza pneumonia serum. "It would seem reasonable to believe that in all probability the donor's serum is so rapidly diffused or diluted in the blood stream that hemolysis and agglutination of a dangerous nature will not follow." In an effort to compare the reaction following the intravenous administration of manufactured standard therapeutic sera to that of the poorly matched blood transfusion, and offer an explanation of a possible cause for these phenomena, the procedure was as follows: We applied a simple test, used in the laboratory for selecting suitable donors for transfusions, to samples of blood-cell suspensions secured from a number of individuals against various stock therapeutic sera on hand. These suspensions of blood corpuscles were obtained from patients coming to the laboratory for Wassermann tests.

The technique of the agglutination test was carried out after the emergency method of Lee (*Stitt's Practical Bacteriology, Blood Work, and Animal Parasitology*, fifth edition, p. 245. See footnote.) The fact that an individual had a positive Wassermann reaction seemed to have no bearing upon the agglutination phenomena in the various sera tested. We diluted the loopful of serum and loopful of corpuscles with a loopful of normal saline in a large number of cases to check up the reactions without this dilution, and no difference in results was obtained. We therefore diluted all of our tests

with a loopful of normal saline solution, as it then diluted our mixture just enough to give us a not too concentrated mixture for reading our results. A loopful of normal saline solution mixed with a loopful of our red cell suspension was used as a control test in every instance. There was no evidence of any auto-agglutination. All of our tests were conducted at room temperature, within a period of three hours after collecting our red cells in the citrate solution. No rouleaux formation of the red corpuscles was confused with the agglutinations, and only typical reactions were recorded as being positive.

The following table shows our results in tests conducted on the red cell suspensions from 100 different individuals:

TABLE I.

Case.	Antimenin- gococcus serum.	Antipneu- mococcus serum.	Diphtheria antitoxin.	Tetanus antitoxin.	Normal horse serum.	Antistrep- tococcus serum.	Normal saline solution.
1.....	+	-	-	-	-	+	-
2.....	+	-	+	-	+	+	-
3.....	+	-	-	-	-	+	-
4.....	+	-	-	-	-	+	-
5.....	+	+	-	-	+	+	-
6.....	+	-	-	-	+	-	-
7.....	+	-	-	-	+	-	-
8.....	+	+	-	-	-	-	-
9.....	+	-	-	-	-	+	-
10.....	+	-	-	-	-	+	-
11.....	+	-	+	-	+	+	-
12.....	+	+	-	-	-	+	-
13.....	+	-	-	-	+	+	-
14.....	+	-	-	-	+	+	-
15.....	+	-	-	-	+	-	-
16.....	+	-	-	-	+	-	-
17.....	+	-	-	-	+	+	-
18.....	+	+	-	-	+	+	-
19.....	+	-	-	-	+	+	-
20.....	+	+	-	-	+	+	-
21.....	+	-	-	-	-	+	-
22.....	+	-	-	-	+	-	-
23.....	+	-	-	-	-	+	-
24.....	+	-	-	-	-	+	-
25.....	+	+	-	-	+	-	-
26.....	+	-	+	-	+	+	-
27.....	+	-	-	-	+	-	-
28.....	+	-	-	-	+	+	-
29.....	+	+	-	-	+	+	-
30.....	+	+	-	-	+	-	-
31.....	+	+	-	-	+	-	-
32.....	+	-	-	-	-	+	-
33.....	+	+	-	-	+	-	-
34.....	+	-	-	-	+	+	-
35.....	+	-	-	-	+	+	-
36.....	+	-	-	-	+	+	-
37.....	+	+	-	-	-	+	-
38.....	+	-	-	-	+	+	-
39.....	+	+	-	-	-	+	-
40.....	+	-	-	-	-	+	-
41.....	+	+	-	-	+	-	-
42.....	+	+	-	-	+	-	-
43.....	-	+	-	-	+	-	-

TABLE I—Continued.

Case.	Antimenin- gococcus serum.	Antipneu- mococcus serum.	Diphtheria antitoxin.	Tetanus antitoxin.	Normal horse serum.	Antistrep- tococcus serum.	Normal saline solution.
44.....	+	+	—	—	+	+	—
45.....	+	—	—	—	+	—	—
46.....	+	—	—	—	+	—	—
47.....	+	—	—	—	+	—	—
48.....	+	+	—	—	+	—	—
49.....	+	—	—	—	+	—	—
50.....	+	+	—	—	+	—	—
51.....	+	+	—	—	+	—	—
52.....	+	+	—	—	+	—	—
53.....	+	—	—	—	+	—	—
54.....	+	—	—	—	—	—	—
55.....	+	+	—	—	+	—	—
56.....	+	+	—	—	+	—	—
57.....	—	—	—	—	+	—	—
58.....	—	—	—	—	+	—	—
59.....	+	—	—	—	—	—	—
60.....	—	—	—	—	—	—	—
61.....	+	—	—	—	+	+	—
62.....	+	+	—	—	+	+	—
63.....	+	+	—	—	+	+	—
64.....	+	+	—	—	—	+	—
65.....	+	—	—	—	—	+	—
66.....	+	+	—	—	+	+	—
67.....	+	+	—	—	+	—	—
68.....	+	+	—	—	+	+	—
69.....	+	—	—	—	—	—	—
70.....	+	—	—	—	+	—	—
71.....	+	—	—	—	+	+	—
72.....	+	+	—	—	—	+	—
73.....	+	+	—	—	—	+	—
74.....	+	—	—	—	+	—	—
75.....	+	—	—	—	+	+	—
76.....	+	+	—	—	+	+	—
77.....	+	—	—	—	+	+	—
78.....	+	—	—	—	—	—	—
79.....	+	—	+	—	+	—	—
80.....	+	—	—	—	—	—	—
81.....	+	+	—	—	—	—	—
82.....	+	+	—	—	—	—	—
83.....	+	—	—	—	—	—	—
84.....	+	—	—	—	—	—	—
85.....	+	+	—	—	+	—	—
86.....	+	+	—	—	—	—	—
87.....	+	+	+	—	+	—	—
88.....	+	+	—	—	+	—	—
89.....	+	—	—	—	—	—	—
90.....	+	+	—	—	+	—	—
91.....	+	—	—	—	+	—	—
92.....	+	+	—	—	—	—	—
93.....	+	+	—	—	+	—	—
94.....	+	—	—	—	—	—	—
95.....	+	—	—	—	—	—	—
96.....	+	—	—	—	+	—	—
97.....	+	+	—	—	+	+	—
98.....	+	—	—	—	+	—	—
99.....	+	+	—	—	+	+	—
100.....	+	+	—	—	+	—	—
101.....	+	—	—	—	+	+	—

Positive agglutination is represented by (+). No agglutination is represented by (—).

17908—20—7

Total agglutinations.

	Positives.	Negatives.
Meningococcus serum.....	96	4
Pneumococcus serum.....	43	57
Diphtheria antitoxin.....	5	95
Tetanus antitoxin.....		100
Normal horse serum.....	67	33
Streptococcus serum.....	45	55
Normal saline solution.....		100

Case 60, or 1 per cent of the total, showed no agglutination in the 100 tests, 9 per cent agglutinated in only the meningococcus serum, 3 per cent agglutinated in normal horse serum only, 14 per cent agglutinated in only the meningococcus and normal horse serum. Tetanus antitoxin gave no agglutinations throughout. Diphtheria antitoxin showed agglutination in only 5 per cent of the cases. Meningococcus and normal horse serum gave the highest percentage of agglutinations with 96 per cent and 67 per cent, respectively. No difference in the agglutination reactions was obtained in 25 tests carried out using meningococcus serum manufactured by two different houses.

CONCLUSIONS AND COMMENT.

Up to the present we have been unable to reach any definite conclusions as to the presence of an agglutinin in the serum being responsible in whole or in part, for many of the reactions following intravenous administration of various sera. We are at present collecting data at this laboratory on all patients that receive any therapeutic serum intravenously. We match the recipient's cells with the therapeutic serum he is to receive, and note any reaction or symptoms that follow the administration and classify the reaction with the matching tests carried out. We hope to present a series of such cases at some future date and attempt to prove or disprove the existence of any relation between corpuscle agglutination and anaphylactic or protein shock reactions. Since starting this procedure we have only used intravenous therapeutic sera in two cases. One in a Type I pneumococcus lobar pneumonia (Type I antipneumococcus serum being used), and the other in a Type II pneumococcus lobar pneumonia (polyvalent antipneumococcus serum being used). In neither individual was there any agglutination of his red cells by the serum, and in only the latter case was there any sign of a reaction, as shown by only a slight chill followed by a small amount of perspiration. Both patients showed marked improvement following the administration of the serum.

In the case of the individual mentioned in the first part of this paper, who had a violent reaction following the intravenous administration of diphtheria antitoxin, we were able to obtain a specimen of his blood two months after his recovery. In testing out his red cell suspension with the various sera, we obtained the results noted as case 101 in our table. No agglutination of his cells occurred with the diphtheria antitoxin, at this time.

The points of interest on this subject of agglutination that seem to us deserving of future investigation are: (1) Is the reaction that frequently follows an intravenous administration of a therapeutic serum due alone to a protein reaction, or is it related to the presence of an agglutinin or some other such substance in the serum? (2) Are these agglutinins permanently present in the individual immune serum as antimeningococcus serum from various manufacturing houses, or are they merely temporary factors present in the specimen at the time tested? (3) Are these agglutinins or substances increased by various previous foreign protein inoculations? (4) What is their nature?

Our results at this hospital with cerebro-spinal meningitis last winter seemed to indicate that more favorable results followed the cases that were not treated by intravenous administrations of antimeningococcus serum. Whether the fact that in our agglutination experiments we obtained red-cell agglutination in 96 per cent of our cases with antimeningococcus serum has any bearing on this point is a matter for thought.

We do not advocate discontinuing the intravenous injection of immune sera should a matching test show the presence of an agglutination of the cells. The beneficial results obtained by administering the protective antibodies far outweigh any possible deleterious effects from a possible reaction that might obtain. However, if an agglutination of the cells is present, we recommend that the serum be well diluted with warm (body temperature) normal saline solution before being administered intravenously, and that the physician be prepared to combat any reaction that appears by means of external heat and the use of adrenalin chlorid solution administered intravenously at frequent intervals.

NOTE—Emergency method of Lee: "A small amount of blood is collected from a patient (1 c. c. from the ear or finger is sufficient) and allowed to clot. The serum is then obtained. One drop of this serum is placed on a slide and mixed with a drop of suspension of blood of the donor taken into 1.5 per cent citrate solution. (A few drops of blood are taken into approximately ten times the amount of 1.5 per cent citrate solution and shaken. It is very important that the blood be dropped directly into the citrate and should not be partially coagulated.) The test will appear in a few moments and is best examined under the microscope, where, in the event of a positive, marked agglutination will be

evident." We placed our serum corpuscle mixture on a clean cover slip and inverted it over a hollow-ground slide and sealed the edges with petrolatum.

TABLE II.

Case.	Anti- menin- gococcus serum.	Pneu- mococ- cus serum.	Diph- theria anti- toxin.	Tetanus anti- toxin.	Normal horse serum.	Strepto- coccus serum.	Normal saline.	Type 2.	Type 3.	Wasser- mann.
1....	+	+	+	-	-	-	-	+	+	-
2....	-	-	-	-	+	-	-	+	+	-
3....	+	-	-	-	-	-	-	-	-	-
4....	-	-	-	-	-	-	-	-	+	++
5....	+	+	-	-	+	-	-	-	+	++
6....	-	-	+	+	-	-	-	-	-	-
7....	+	-	-	-	+	-	-	-	-	-
8....	-	-	-	-	+	-	-	+	-	-
9....	+	-	-	-	+	-	-	-	+	-
10....	-	-	-	-	+	-	-	-	-	-
11....	+	+	-	-	+	-	-	-	-	+
12....	-	-	-	-	-	-	-	-	+	++
13....	-	+	+	-	-	-	-	+	+	+
14....	-	-	-	-	-	-	-	+	-	++
15....	+	-	-	-	+	-	-	-	-	++
16....	-	+	-	-	+	-	-	-	-	++
17....	-	-	-	-	+	-	-	-	+	-
18....	-	+	-	-	-	-	-	-	-	-
19....	-	-	-	-	+	-	-	-	-	-
20....	+	-	+	-	+	-	-	-	-	-
21....	+	+	-	-	-	-	-	-	-	+
22....	-	-	-	-	+	-	-	-	+	+
23....	+	-	+	-	-	-	-	+	+	+
24....	+	-	+	-	-	-	-	-	-	+
25....	-	-	-	-	-	-	-	+	-	+
26....	+	-	-	-	+	-	-	-	-	+
27....	+	-	+	-	+	-	-	-	+	+
28....	+	-	+	-	+	-	-	+	-	+

Cases Nos. 4, 12, 14, and 25 of blood groups 2, 2, 3, and 3, respectively, show no agglutinations. While all of these cases have either a single or double plus Wassermann reaction there are enough positive serums in the other cases to show that a positive Wassermann need have no particular bearing on the agglutinations alone.

A CONVENIENT METHOD OF PREPARING A VASELINE RING FOR HANGING DROP PREPARATIONS.

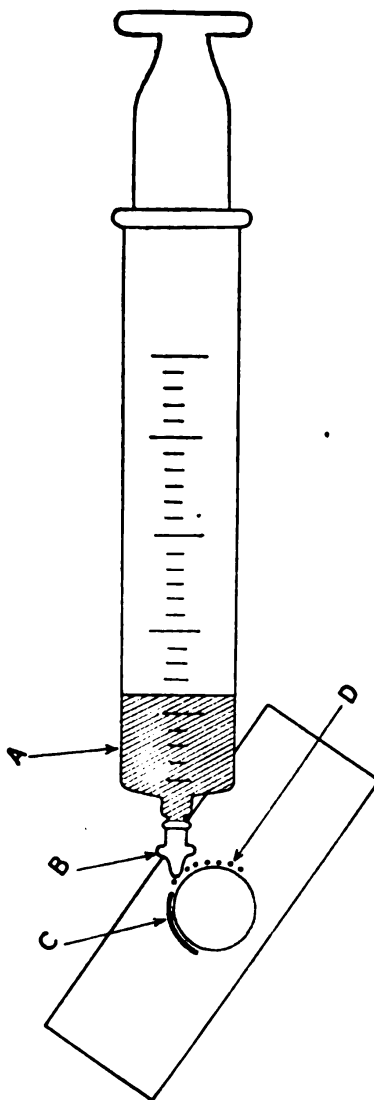
By D. G. WILLARD, Hospital Apprentice, First Class, United States Navy.

Placing a vaseline ring around the concavity on a slide for hanging drop preparations while not difficult is at times troublesome. In making these preparations it is usual to employ a camel's hair brush, wooden applicator, or cotton swab, with varying results as to neatness and efficiency. At the U. S. Naval Hospital laboratory, Mare Island, Calif., we have been making as many as 190 hanging drop preparations a day in connection with red blood-corpuscle agglutinations, and the old method of applying the vaseline ring was found

to be very unsatisfactory. As a result I devised the scheme of using an old 20 c. c. ground glass syringe and a hypodermic needle with the needle portion broke off at its base.

The vaseline is drawn into the syringe in the usual manner and the hypodermic needle cap is placed on the syringe. The vaseline is then forced through the needle cap in a very fine ribbon around the rim of the concavity in the form of a continuous layer (fig. C) or in a series of small droplets (fig. D). The slide may then be inverted on the cover slip and the vaseline seals off the concavity in the usual manner. When through with the preparations the syringe may be placed upon the shelf intact, and it is always ready for use. In cold weather if the vaseline becomes too solid to flow easily, that portion of the syringe containing it may be passed once or twice through a flame, and contents will then be found of the right consistency for flowing easily through the needle opening. The accompanying sketch is an attempt to describe the procedure graphically.

Since using the syringe container for vaseline we have also applied it to our immersion or cedarwood oil. The wide-mouth containers for immersion oil are clumsy, frequently become sticky, and hence often easily broken. As a result the oil tends to harden on exposure to air when left uncovered. Then, too, the glass rod applicator so commonly made use of to carry a drop of oil to the slide to be examined tends to get the oil over its entire length, with resulting soiling of the fingers. The glass rod also gives a drop of oil of varying sizes on the slide. Here at the laboratory we now use 2 c. c. all-glass syringes with the cut-off hypodermic needle cap, as described above, to hold our immersion oil. The oil in the syringe does not tend to dry out and gives a drop of any desired size. When not in use the syringes are held in a pencil rack on the wall above the working shelf. We have found them very efficient, clean, and convenient.



THE PREPARATION OF COLLOIDAL GOLD SOLUTION.

By M. KARLEN, Reserve Nurse Corps, and A. E. BOURKE, Pharmacist's Mate, First Class,
United States Navy.

The preparation of colloidal gold solution for use in the Lange gold chloride test on the cerebro-spinal fluid is a process frequently fraught with many difficulties. At this laboratory we have had success alternate with failure at various times for no apparent reason. Whenever we have encountered difficulty in the preparation of the solution we have checked up each step, attempted various methods, used fresh reagents, and water distilled five times. All of our efforts the past summer were unavailing until we used as a cleaning fluid, instead of aqua regia, a solution suggested by Craig. It is composed of 500 gm. of potassium bichromate, 500 c. c. commercial sulphuric acid to 5,000 c. c. of distilled water. The process of cleaning the glassware that we utilized is as follows: All of the glassware is thoroughly washed in tap water to start with. It is then boiled in distilled water to which a small amount of tincture of green soap has been added. Upon removing the ware from this solution it is rinsed well in hot tap water, and then placed in the bichromatic acid-solution for from two to three hours. The apparatus is then removed from this mixture and again rinsed in hot tap water. At this point rubber gloves are removed and should not again be brought in contact with the ware. The glass is then rinsed in single distilled water, transferred to triple distilled water for final bath, and then placed in a hot-air oven for two hours at 90 C.

The numerous methods used by different laboratories to prepare the colloidal gold solution seem to differ solely in the quantity and strength of formalin used, and in the addition or absence of oxalic acid. We finally obtained our best results by using the method in vogue at the laboratory of the Leland Stanford Medical School, after cleansing our glassware as described above. The method used is as follows: Place 1,000 c. c. of triple distilled water over a flame and heat to 60 C. Then add 10 c. c. of a 1 per cent gold chloride solution drop by drop, and 10 c. c. of a 2 per cent potassium carbonate solution drop by drop, while still heating. Allow temperature to come rapidly to 90 C. (Liquid will just commence to boil at this temperature.) Then while agitating vigorously add 10 c. c. of 1 per cent formalin.

We found it important to add the gold chloride and potassium carbonate drop by drop. By making the solution in an Erlenmeyer flask one is more easily able to agitate the mixture, without using a stirring rod in the process.

OBSERVATIONS ON REFRACTION WITH REPORT OF 75 CASES AT NAVAL HOSPITAL, MARE ISLAND, CALIF.

By W. D. HORNER, Lieutenant, Medical Corps, United States Navy.

Dealing as we do with a picked body of young men in the service, eye pathology, barring injuries, is uncommon. However, defective vision due to errors of refraction is frequently met with and warrants the closest attention of the medical officer.

A man with normal distant vision, but who can not comfortably read ordinary print for more than 20 or 30 minutes soon gets out of the reading habit, thus losing the benefit of much worth-while information. Especially is this true when he is detailed at one of the numerous schools of the Navy.

In a striking number of cases men reporting with eye complaints give a history of having worn glasses at some time prior to enlistment but have "thrown them away to get into the service." Naturally, such men turn up at the eye clinic later with symptoms of eye strain. In explaining the use of glasses to these men and others who require them, the analogy of glasses to crutches is frequently used. Throwing away a crutch helps a diseased leg just as much as tossing a pair of glasses over the back-yard fence aids vision. Benefit comes only through use.

This series covers 75 consecutive refractions done by the author in the hospital eye clinic at Mare Island and represents approximately one-half of the total clinic cases seen in the past six months. Sixteen were officers and 59 were enlisted men.

Two medical officers are regularly assigned to the eye, ear, nose, and throat service. Because of the volume of work in this department, out-patient refractions were limited as nearly as possible to two mornings per week in which a total of 6 to 8 cases were seen. Hospital cases were attended to as soon as possible after entrance.

The routine followed in refraction included a preliminary test of vision and external eye examination, a careful case history, the patient's name, rate or rank, age, kind of detail, past and present complaints, amount of education, past illnesses having any bearing on the case, previous glasses or no, and length of service.

Our eye room is fitted with a well-illuminated light box containing the test letters in a scroll and roller arrangement. Changes of letters are made at the surgeon's chair by pulling a string connected to the light box. There is a full 20-foot space from the patient's chair to the test letters and vision of from 1/20 to 20/15 may be tested without patient or surgeon changing position.

All refractions were done under cycloplegia. Homatropine solution 2 per cent combined with cocaine solution 2 per cent, one drop in each eye every five minutes for from 3 to 6 drops constituted the

routine. The patient was refracted in one hour from the instillation of the last drop. Atropine sulphate solution, 2 per cent, was used in a few specially indicated cases.

Retinoscopy was done in each case and with the greatest care to obtain the exact point of reversal as accurately as possible. This procedure was carried out in the dark room at a measured distance of 1 meter from the patient's eye. The source of illumination was a lantern-like box with 1½-inch aperture, illuminated by a frosted electric globe and situated slightly behind, above, and to the right of the patient's head.

Following retinoscopy, the test lenses were used and vision corrected as nearly as possible to 20/20 or 20/15. Muscle balance was then tested by the Maddox rod method with patient's correction in place. The fundus was next examined, by the direct method in most cases, and the condition of the media noted.

After 72 hours a post-cycloplegic test was done and glasses prescribed. In some cases glasses were prescribed without a post-cycloplegic, but where time permitted this test was always done.

The highest plus sphere consistent with clear distant vision was prescribed for hyperopics, the cylinders usually remaining the same as obtained by retinoscopy and the trial case. The least minus sphere consistent with clear distant vision was prescribed for myopics, the cylinder remaining unchanged from the trial-case findings. Presbyopia was encountered only twice in this series, both instances being in officers past 40 years of age.

In analyzing the symptoms headache occurred most frequently, being noted in 35 out of 67 cases, or 52 per cent. Blurred vision was next, occurring in 46 per cent of cases. "Strained feelings," diplopia, and burning occurred less frequently in the order named.

Of the series 27 or 36 per cent had vision below naval requirements—that is, less than 15/20 unaided vision in each eye. Forty per cent of this number were brought up to 20/20 by glasses.

Poor vision was attributed in 5 cases to previous diseases, those mentioned being scarlet fever, diphtheria, and pneumonia. One man presented a clear case of toxic amblyopia following diphtheria contracted in line of duty. This man stated, and enlistment records showed, that vision was normal at enlistment in September, 1919. In February, 1920, he contracted diphtheria and during convalescence he noticed great difficulty in reading ordinary print and letters. No improvement took place and examination by us six months later showed vision of only 3/20 not improved by glasses. He was subsequently surveyed from the service.

In considering a case like the above, where loss of vision is claimed in line of duty, one would naturally seek aid from the health record to learn what vision was recorded at the time of enlistment. Unfor-

tunately this record is so unsatisfactory and inaccurate in many cases that it can not be taken at its face value.

In checking back on cases where vision is found defective at examination one is struck by the frequency with which such men's vision is recorded as 20/20 by the recruiting officer. Especially is this so in cases where vision is poor and can not be improved by glasses. Upon questioning, some men gave history of no eye examination at all, a few stated that they were told to read some business sign across the street, others said that the recruiting officer admitted that their vision was poor, but as they wanted to enlist badly he let them by. One man tried three different recruiting stations, and was finally passed. His vision was 8/20. However, almost invariably, these men were given vision of 20/20 on their enlistment records. Such records are not fair to the Government when used to decide line-of-duty status. A more careful examination and record of vision and also hearing in recruits would save many sick days later when their commanding officers send them to the hospital because of physical unfitness for duty.

Hypermetropia was the most common single form of refractive error, occurring in 33 per cent of eyes examined and almost twice as frequently as its nearest competitor, mixed astigmatism. The diagnoses in tabular form are given below. For computation the single eye, not the patient, is taken as a unit, as two different forms of refractive error may occur in one patient.

Diagnosis:	Number of eyes.
Hypermetropia.....	50
Mixed astigmatism.....	27
Compound hyperopic astigmatism.....	23
Compound myopic astigmatism.....	19
Hyperopic astigmatism.....	11
Amblyopia.....	10
Myopia.....	5
Myopic astigmatism.....	3
Emmetropia.....	2

As will be noted, astigmatism of all types alone or in combination occurred in 83 eyes, or 55 per cent. Where vision could be improved by the addition of a cylinder this was done even though the bulk of the refractive error was spherical.

The fundus was abnormal in 16 cases, of which 8 consisted in blurring of the disk to a greater or less extent and without signs of active pathology.

Very tortuous vessels and sclerotic vascular changes were noted in one case; a medullated nerve fiber found in one; pallor of the disk in two cases, both being survey cases with negative Wassermanns and contracted fields of vision. A beginning myopic crescent was seen once. Frank papillitis with choroiditis in the exudative stage

was noted in one case. This patient was given a note to the medical officer of his ship stating the findings and advising transfer to the hospital for observation and treatment. Unfortunately he failed to return and was not seen again. Floating opacities in the vitreous were noted once but vision was 20/20 notwithstanding.

In muscle tests, esophoria was the most frequent abnormality, being noted in 65 per cent of 32 cases when muscle records were available. Hyperphoria was next in frequency, exophoria then followed, while a well-defined squint was seen in only 3 cases.

Normal vision was obtained in 70 per cent of the series. Improvement but not normal vision occurred in 18 per cent. In 12 per cent no improvement resulted. Three of the unimproved or amblyopia cases were invalidated from the service.

Glasses were prescribed in approximately 70 per cent of cases. The majority of these were advised for reading or close work only.

The average vision for the group of 75 cases was 15/20. This fell to 8/20 under cycloplegia, but was corrected to 18/20 by glasses. The average decrease of vision from 15/20 to 8/20 by relaxation of the ciliary muscle under cycloplegia is a strong argument for its use in getting an idea of the total refractive error. Satisfactory relaxation of the ciliary muscle without drops is not obtainable at the age of most of our patients.

As the author is an enthusiast over the use and value of the retinoscope, careful comparison was made between retinoscopic and test-case results.

The method used is as follows: A single eye was taken as a unit. The retinoscope lens values for both meridians were added and compared with a similar sum obtained by subjective test lenses. The test case was adopted as the standard or correct value and variations above or below it were expressed in percentage as retinoscopic errors. This percentage of error was figured for 121 eyes and gave a general average of 29.8 per cent.

In 11 cases, or 18 per cent, the so-called scissors movement of the retinoscopic shadow was encountered and only a rough approximate result could be obtained. These cases were not included in the above.

In 79 instances, or 65 per cent, retinoscopic estimations exceeded test-case figures. In 42 instances they fell short.

Retinoscopy has proved a most valuable procedure in our hands and is in the majority of cases quite accurate. While without doubt the test case is the real criterion in refraction, a close and quick approximation of the error is easily obtained by the retinoscope.

The following conclusions seem justified in summarizing:

1. Errors of refraction are frequent in the naval service.
2. Proper glasses will bring vision up to normal in the majority of cases, as actual eye pathology is infrequently met with.

3. Eye examinations at the time of enlistment should be carefully conducted, so that the vision records may be accurately and honestly recorded.

4. Retinoscopy is a valuable procedure in refraction and can give accurate results in about 70 per cent of cases when carefully done.

EMPYEMA CASES.

By E. R. GUINAN, Lieutenant, Medical Corps, United States Navy.

Last winter it was my fortune to handle 49 cases of suppurative pleurisy from the date of their diagnosis and transfer to the surgical service until the time that the pneumonia wave passed away in early spring. This paper is intended as a report to cover our experiences with empyema during that period with a view to compare if possible our results with those obtained at other hospitals last winter and preceding winters since the outbreak of the war.

Of these cases, two were admitted to the medical service with the diagnosis of measles, 20 with influenza, 14 with either lobar or broncho-pneumonia, 4 with acute bronchitis, 1 with diagnosis undetermined, and 7 were transferred to our hospital from other services with their condition already established. Those cases that were not admitted with a diagnosis of lobar or broncho-pneumonia all developed pneumonia either preceding or simultaneously with suppurative pleurisy.

Practically all the men were in the second decade of life and practically all were recent enlistments and were undergoing their preliminary training at the training camps. With few exceptions none were of the hard, sturdy physical types met with during the war but, on the contrary, were undeveloped boys, several showing thoracic malformations such as pigeon breast and funnel breast.

All the cases, with the possible exception of one, were secondary to some demonstrable focus of infection somewhere else in the body, this focus invariably being pneumonia. The exudate formed rapidly, often seemingly simultaneously with the pneumonia process, the exudate at first being of a high-colored serous or serofibrinous type, quickly followed by a slight murkiness which rapidly progressed to a purulent state within two weeks or less from the date of onset in spite of repeated aspiration.

Etiology.—The principal predisposing cause seemed to be a preceding severe illness combined with a lowered resistance to infection brought on by their undeveloped physical state and undue exposure to damp and cold. The exciting cause in the great majority of cases was the *Streptococcus hemolyticus*, and in the remainder the pneumococcus was found. The point emphasized by Moschowitz, viz,

that the gross contamination of the pleura came from ruptured focal abscesses in the lung, rather than by direct contiguity or along the lymph channels, was confirmed by autopsy in some of the cases. That this method of extension is the way contamination of the pleura does take place, I believe to be conclusively proven by Moschowitz, when we consider that the lymph channels drain away from rather than toward the pleura. A perfectly analogous condition would be purulent peritonitis following rupture of the appendix.

Physical findings.—The physical signs were those of fluid in the chest, and while no one sign in particular was constantly present several were present in a sufficient number of cases to warrant placing a great deal of reliance on them, especially in cases where there was doubt as to the exact location of the pus and in small encapsulated or interlobar empyema cavities. The signs that the greatest reliance could be placed on were absolute flatness on percussion with a marked sense of resistance to the finger, lagging of the chest on the affected side, limitation of diaphragmatic movement on the affected side and egophony. While these signs were always sought for as suggesting empyema, there were usually present other physical findings of great importance. The other signs usually found were distant breath sounds, bronchial or bronchovesicular breathing, diminished vocal and tactile fremitus, crepitant and moist râles and diminution of whispered voice. In those cases with small encapsulated empyema there was an increase in the transmission of the whispered voice which was probably due to adhesions between the visceral and parietal pleuræ surrounding the encapsulated process and the area of consolidation in the underlying lung area.

Clinical course.—Clinically all the cases, with the possible exception of one, were postpneumonic. They ran at first what seemed to be a lobar or broncho-pneumonia temperature curve. Some apparently progressed favorably for short intervals, as evidenced by the improvement in the temperature curve, only to be followed by an increase in the respiratory symptoms and a marked septic temperature, while others presented marked respiratory difficulty from the very beginning of their illness, which factor, as Stone in his observations pointed out, when present with a pleural friction rub and a pulse rate out of proportion to the fever, is strongly suggestive of pleural effusion or empyema. The breathing in most instances was labored and of the costal type, while in one or two instances when the patient was suffering from bilateral empyema the breathing was of the abdominal type. Coughing was incessant and painful and was so aggravating that the majority of the patients begged for relief. The cough was, as a general rule, productive, and in a few instances purulent sputum was expectorated. Emaciation was marked, the natural result of dehydration and nitrogen loss, which

accompanies chronic sepsis. The temperature was of the septic remittent type, and while the temperature curves were similar in all cases the high points of fever varied and seemed to bear no relation to the gravity of the disease, many being extremely ill with a low temperature, while others with a high temperature did not appear to be so ill and were up and about shortly after operation. The leucocyte count was high, varying from 15,000 to 30,000, with the percentage of polynuclears averaging about 90 per cent. The general appearance of all was pathetic, the rapid emaciation, the hectic flush on their cheeks, the blanched lips and ears, the sunken eyes, the dried, parched lips, the anxious expression, the labored breathing, all combined, serving to emphasize the extreme suffering of the patients, and it was remarkable to see the gain in weight and the rapid improvement in the general condition following operation.

Diagnosis.—In making a diagnosis one should bear in mind that every pneumonia of the epidemic form, or those that follow the infectious diseases, is a potential empyema. We should always suspect a beginning pleural effusion in a pneumonia with a pleural friction rub and a pulse rate out of proportion to the temperature. The physical signs are those of pleural effusion and have been enumerated above. Although flatness on percussion, limitation of diaphragmatic movement, lagging of the chest on the affected side and egophony are the best signs, all the signs of fluid when present following pneumonia, complicated by a friction rub, immediately suggest exploratory thoracentesis. This procedure should never be omitted and in case of doubt it is the deciding factor. It should be done carefully because, if improperly performed, a great amount of damage may be done by puncturing a diaphragm pulled up by adhesions, or by puncturing pneumonic tissue and producing a closed pneumothorax. Roentgenograms of the chest are an invaluable aid to diagnosis and should be a routine procedure. This is of particular value in confirming physical findings, in locating the cavity or cavities, in giving us an insight into the pneumonic process and definitely locating the diaphragm. Fluoroscopy should be a routine procedure before operation in order to definitely determine the best site for operation, such site usually being the lowest point in the cavity consistent with effectual drainage. In the small encapsulated and in the interlobar empyema cavities it is obvious that the fluoroscope is of great help in determining the site of operation.

Complications.—The complications met with in this series of cases were the usual complications that accompany empyema, further complicated by an outbreak of diphtheria, which threatened for a short period to sweep the wards clean, two patients dying of severe diphtheria before its spread could be checked. Seven had bilateral empyema, three being admitted with this condition already developed

and four developing it, subsequent to admission. Four died of this complication, two recovered by repeated aspiration before frank pus developed, but both developed a unilateral empyema, and one had a small encapsulated empyema on the right side at the base in the posterior supradiaphragmatic area and a fully developed empyema involving the entire left pleural cavity. He recovered completely from both conditions, the left side having been resected and the right side repeatedly aspirated, followed by injections of formalin and glycerin.

Pericarditis was present in four of the cases that came to autopsy and in two of the convalescent cases. Of those that came to necropsy, in two instances the pericarditis was purulent in character, complicating a bilateral empyema. One had adhesive pericarditis complicating empyema of the right side, and in one fibrin organization had taken place, producing "shaggy heart." This case also was a bilateral empyema. In the two cases convalescent the friction rub was transitory, but the pulse was feeble, rapid, and arrhythmic for some time following its disappearance. Substernal abscess was present in two of the cases that came to autopsy. Both had pericarditis with purulent effusion and in both cases the diagnosis of substernal abscess was not made before death. Lung abscess was found in two of the cases that came to necropsy. One of them also had a substernal abscess and a purulent pericarditis. Peritonitis occurred in but one case, a bilateral empyema that came to necropsy. The peritoneal cavity was full of frank pus, and thorough search failed to reveal any perforation along the alimentary tract or any other focus in the abdomen, so it is believed that extension took place through the diaphragm. Nephritis was the most frequent complication, being present in all the cases that came to necropsy and in 30 per cent of those recovering. The nephritis was usually of the acute diffuse or parenchymatous types, and ranged in severity from those with simple albuminuria and granular casts that usually accompany severe infectious diseases to those with albumin, casts, high blood tension, and edema. Multiple arthritis with effusion occurred in two cases, the wrist joints, ankle joints, and knee joints being the principal joints involved in one case, while in the other case all the joints were more or less involved. Both cases cleared up following operation and evacuation of the pus. Myocardial softening was found in all the cases that came to necropsy.

Treatment.—Profiting by the experience gained by those in charge of our large military hospitals during the war, the initial procedure in the treatment of the empyema cases, besides the treatment of the acute pneumonic process itself, was aspiration. This procedure was followed until the acute pneumonic process had subsided. In all the cases aspiration had been performed two or three times while the cases were still in the medical wards and from two to three times fol-

lowing their admission to the surgical service. The aspirations were performed by means of the Potain aspirator in the great majority of cases and by means of a large 50 or 100 mil glass syringe in those cases where the flow could not be established because of large fibrin deposits or thick pus. In those cases where the pus was thick and inspissated, the procedure was to inject warm normal saline into the pleural cavity to thin out the pus, and then aspirate the cavity contents. A cure was effected in one side in two cases of bilateral empyema before frank pus developed. The other side, however, developed frank pus in both cases. Aspiration was resorted to every 48 to 72 hours, the amount withdrawn depending on the quantity and character of the pus and the reaction of the patient to the withdrawal procedure. The benefits of this measure were immediate, the pulse rapidly improved in quality, cyanosis and dyspnea were reduced, the patients were comfortable, and they were always markedly cheered and their drooping spirits made more buoyant by knowledge of the fact that pus had been withdrawn from their chests. Incidentally several deleterious mechanical effects are removed by this measure, viz, pressure upon the heart and compression of the lung.

Much has been said by different observers as to the correct procedure to be followed when surgical intervention becomes necessary. Some speak with great fervor in favor of costatectomy, others of simple thoracotomy. In this series of cases both operations were employed with success after repeated aspiration had been performed and the acute pneumonic process had definitely subsided. In none of the cases was operation performed earlier than the 14th day of the disease and in the majority of the cases the average was nearer 20 days. Costatectomy was performed in 20 cases, 3 of which were secondary to thoracotomy. Eight were on the left side and 12 on the right. Simple thoracotomy was performed on 29 cases, 16 of which were on the left side and 13 on the right side. The first cases operated were costatectomies in all of which the process was of long duration, thick pus was present in large quantities, adhesions had formed encapsulating the empyema process, and the great majority of which had been sent to the naval hospital from other stations after the empyema had developed. Later, when the admission rate was more rapid following the influenza wave and because of the vigilance of the medical service in detecting the conditions earlier, thoracotomy was performed in the majority of cases.

Methods of operation.—In all the cases, with three exceptions, local anesthesia was used. Procain 2 per cent and apothesine 1 per cent being the drugs used. The method was to infiltrate the skin over the area to be operated upon, then the muscle over the rib to be resected or the intercostal space to be incised, and finally the periosteum covering the rib. No description is necessary for the method of per-

forming costatectomy. All are familiar with it. In performing thoracotomy the method used was that of Ransohoff in use at the Cincinnati General Hospital. After the preliminary steps mentioned above a trocar was inserted into the empyema cavity at the lowest possible point where pus could be obtained. Then an incision from $1\frac{1}{2}$ to 2 inches long was made down to the muscle. Then a grooved director, with the groove approximated to the trocar, was pushed through the muscle into the cavity. The trocar was then removed and a pair of curved forceps passed through the muscle along the groove into the cavity. By manipulation of the forceps the opening could be made as large as necessary. After evacuation of the pus an ordinary nasal speculum was passed into the cavity and the tube inserted through the speculum. A piece of dental dam was then closely fitted over the tube and glued to the skin with rubber cement dissolved in ether in an effort to make the cavity air-tight and protect the skin from maceration and infection. This measure, in addition to the natural contractility of the muscle surrounding the tube, usually sufficed to keep the cavity air-tight. They were then connected up with a vacuum bottle, rigged up on the principle of the Potain aspirator, hung by the side of the bed, and were aspirated every two hours, following which Dakin's solution up to 200 mils was instilled. In the costatectomies the procedure was different. They were not connected up with the vacuum bottles but were irrigated directly through the drainage tubes every two hours with Dakin's solution.

No aspirations or irrigations were performed for 48 hours after operation to permit any fistulous opening from the lung to close over. In spite of this precaution several suffered severely from cough, dyspnea, and pain when irrigations were begun. These difficulties were generally overcome by instilling smaller quantities of Dakin's solution and shifting the position of the patient.

As in all severe infections there is a marked dehydration and nitrogen loss, so in empyema there is a marked nitrogen loss, which fact Bell of the empyema commission confirmed. As a result all the cases were extremely emaciated, so all were given high calorie diets as soon as possible, supplemented with plenty of fluids. The increase in weight of many of the patients under the high calorie diet was remarkable in spite of their prolonged illness and slow recovery. The patients were all put in wheel chairs in from 10 to 14 days, in order to favor expansion of the affected lung, and were further encouraged in the use of the Wolf blow bottles at least once daily. As soon as the patients were recovered sufficiently to be up and about they were encouraged to walk about regardless of temperature conditions, providing their hearts were in good condition. Many of the cases that persistently ran high septic temperatures improved rapidly

after being up and about, so that their temperatures would drop either to normal or to a low curve in from one to two weeks' time. The upright position and natural expansion of the lung resulting from moving about favored this improvement by diminishing the size of the cavity and facilitating drainage. The temperature returned to normal or nearly normal level in the majority of cases in about six weeks' time. After the temperature had returned to normal, which in all cases occurred when the cavities were practically free from pus, the irrigations were reduced in number to three daily, and if the cavities remained free from pus they were then reduced to one daily. When the irrigations were reduced to three daily a constant check was kept on the amount of fluid each cavity would hold, and when the size of the cavity was so reduced that it would not contain more than from 5 to 10 mils of the fluid the tubes were removed and the sinus tract injected with 5 per cent dichloramine-T and a small tape drain saturated with the same solution inserted along the tract. The tract was cleaned daily with Dakin's solution and injected with dichloramine-T until it closed. The initial injections of dichloramine-T were invariably accompanied by a sharp reaction which put the patient back to bed for 24 hours.

At the end of three months 12 of these cases had their tubes permanently out and their tracts were either closed or about closed. All were examined by the fluoroscope at that time and, with the exception of one case with a closed pneumothorax, all were apparently free from fluid, and had fair expansion. Of the remainder all but six were convalescing rapidly and were rapidly approaching the time when it was expected their cavities could be closed. Of the first 12 closed, 7 were resections and 5 thoracotomies. The thoracotomies all closed in a shorter time than the costatectomies and without incident. In the costatectomies it was the rule that the cavities would have to be reopened several times before they were permanently closed. I believe that the reasons the thoracotomies closed more effectively were, first, that expansion of the lung and consequent obliteration of the cavity was favored because the natural contractility of the muscles surrounding the tube, hugged it closely and served to keep the cavity air tight, and that, second, when the cavity was obliterated there was no focus present that served to keep the infection alive like an osteomyelitis or a bony sequestrum that had sloughed away from the rib.

It is not my purpose to enter into a discussion of the relative merits of the two operations, but I believe that thoracotomy properly done is the method of choice in the majority of cases. Certainly the small encapsulated cases, for the above-mentioned reasons, certainly the cosmetic results and the preclusion of extensive secondary

operations such as the Schede, Estlander, or Delorme, are in themselves sufficient to swing the pendulum toward thoracotomy. I also believe that Dakin's solution is the most effective irrigation solution, because it keeps the pus thin and fluid, is nontoxic, and effectually sterilizes the cavity.

The mortality in this series of cases was slightly over 14 per cent. There were seven deaths, two of them caused by diphtheria and the other five from empyema or its complications, four of which were left-side empyema, in three of which costatectomy had been performed. The fifth one was a right-side empyema in which costatectomy had been performed. From these statistics it is readily seen that the largest per cent of deaths were among the left-side empyemas, constituting 80 per cent of the deaths. Four of the fatal cases had double empyema with other complications, so that 80 per cent of the deaths were from that cause.

ACUTE MASTOIDITIS AND A CONSIDERATION OF ITS TREATMENT.

By C. N. MEADOR, Lieutenant, Medical Corps, United States Navy.

Primary acute mastoiditis is of infrequent occurrence. The great majority of cases are of the secondary variety, consequent upon middle ear infection. The underlying symptomatology is a retention of pus under pressure trying to seek an avenue of escape, together with the absorption of toxic elements.

The treatment of acute mastoiditis consists of abortive and operative measures. First, all patients suspected of having a mastoid infection should, if possible, be sent to a hospital, placed in bed, given free catharsis, liquid or soft diet, irrigations, and an ice cap or hot water bag over the mastoid. The writer has secured better results from the use of the ice cap.

Since practically every case of mastoiditis is coincident with or has followed an otitis media, acute or chronic, the treatment of the otitis media is a part of the treatment of mastoiditis and must not be forgotten, for the best means of applying the abortive methods is through this channel. An important matter in the treatment is to leave the patient in the care of and have all ward treatments carried out by a skilled nurse or hospital corpsman, as faulty technic and lack of antisepsis increase the hazards of the case and expose the patient, whose resistance is low, to the danger of additional infection.

Of the cases of acute otitis media which have been in this hospital for treatment, only a few have developed a mastoiditis requiring surgical intervention. Most of the operative cases had the complication before coming under our observation, so that the results of treat-

ment throughout the whole course of the infection could be observed in only three or four cases. In every case the drums were incised freely, for a discharge from the ear by no means indicates sufficient drainage, and if the incisions at any time closed the drums were again incised. When, as in many cases, there was swelling in the posterior, superior wall, an incision was made in the swelling clear up to the posterior wall, thus giving drainage directly from the mastoid antrum and preventing the spread of the infection farther back into the mastoid cells, in most instances. Where spontaneous rupture was allowed to occur or incision was delayed, most of the cases of complete mastoid involvement occurred. Following the incisions irrigations were given every three or four hours. Saline solution has given splendid results as an irrigating fluid, since all that can be expected of it is the washing out of the pus and dilution of the infecting organisms, giving the body a chance to throw out more protection. In the wards the use of the irrigating can by the gravity method is the best appliance, for the slight force of the stream prevents injury to the drum. The can and tip are sterilized before each irrigation. In the treatment room the syringe is more suitable, for it is a time saver and the dangers of its use can be avoided.

Phenol solution is improperly used in the treatment of an incipient otitis media. In many cases, if a patient complains of an aching ear, the doctor will put in a drop or two of phenol, which in some instances gives relief, but in a short time he will find spontaneous rupture of the drum has occurred and pus is pouring out of the ear. Now, if he had examined the ear he would have seen positive indications for myringotomy. This done, proper and adequate drainage established, and the danger of mastoiditis lessened, the drum would heal, leaving a minimum scar. After proper drainage is established, then phenol in some preparation may be instilled into the ear to reach parts not accessible by direct local applications.

The indications for an early operation are more marked when the infective agent is the streptococcus, *B. diphtheriae*, *B. tuberculosis*, or *B. pyocyaneus* than when it is the staphylococcus or a mixed infection.

The advantages of an early operation are rapidity of reparative process, conserving the hearing function, shortening the number of sick days; the operation is more simple and destroys less bone; the danger of cranial and sinus complications is avoided; the possibility of a chronic process developing, requiring a later surgical operation, is avoided. There are certain signs which might be called positive indications for operation, such as edema and swelling in the mastoid region, bulging of the posterior, superior wall, subperiosteal abscess,

cessation of discharge followed by increase or development of retention symptoms, persistent marked tenderness over the antrum for a week or so after the free incision of the drum, persistent discharge, not responding to the local forms of treatment during a month.

If the infecting organism has been found to be a streptococcus, it is good practice to inject 25 to 50 c. c. of antistreptococcic serum the day before operation and a proportionate amount each day for two days following. This serum increases the antibodies and the patient's resistance and thus aids in combating the invading organism.

One complication of not infrequent occurrence that was seen in one case in this hospital will be mentioned. The patient was admitted with a diagnosis of otitis media acute of the left ear. He also had an acute mastoiditis and paralysis of the abducens nerve of the same side as the aural lesion. The explanation is that it is the result of a circumscribed serous meningitis from extension of the infection in the tympanum or mastoid to the tip of the petrous portion of the temporal bone. The abducens lies in contact with the tip of this bone, consequently it became involved by the inflammatory process. The infection can travel through a number of routes to reach the petrous portion, namely, extending from the tympanum below the labyrinth and internal auditory meatus to the petrous tip, by way of the carotid canal; infection through a layer of cells extending along the Eustachian tube, thus passing from the tympanum to the tip. From the mastoid antrum the infection may extend through the subarcuate fossa or petromastoid canal, which passes inward beneath the superior semicircular canal, and reach a layer of cells lying above the internal auditory meatus, and thus arrive at the petrous tip. It was by this last route that the infection was thought to have made its way in this case, although at operation it was impossible to trace it. Following the operation the abducens paralysis cleared up, but the discharge was obstinate for some time before it ceased.

The technique of a mastoid operation will not be discussed, as nothing new has been devised worthy of consideration. However, one point might be considered with reference to the cause of delayed healing due to faulty operation, namely, the places overlooked that might conceal infection. They are, first, the angle between the sinus and the floor of the middle fossa; second, the space between the sinus and the prominence of the digastric groove, and, less frequently, the zygoma, posterior meatal wall, and the tip.

DENTAL FOCI AN ETIOLOGIC FACTOR IN SYSTEMIC DISEASE.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, and B. F. LOVEALL, Lieutenant, Dental Corps, United States Navy.

There are certain types of systemic disease which are readily recognized as being secondary or even tertiary to toxic and bacterial emanations from other locations in the body, which in themselves, too frequently give no indication of their presence. We infer the presence of these primary foci from certain well-recognized findings in addition to the special nature of the disease. The primary observation is that the organ or system whose function is disturbed has no immediate relation, contact, or opportunity to become diseased of itself from within or without the body, except through the blood stream or lymphatics. Further, there is a certain degree of insidiousness and chronicity to the condition, with possible acute exacerbations. In addition, there are the signs of fever (septic afternoon type) and increased white blood cell count with an undue percentage of polymorphonuclear cells. We also recognize a peculiar degree of special susceptibility of certain organs and tissues to certain types of intoxication or infection, each to each, and once established a ready tendency to recurrence when opportunity offers.

These tenets are generally accepted, though often overlooked, for syphilis and focal infection are said to be the most frequent pitfalls in general medicine. It therefore becomes an obligation of the first importance to search for the primary focus. Cases will be met in which this may never be found even when its presence is well indicated. However, these are exceedingly rare, and resourceful effort, combined with persistence, will seldom fail to disclose a focus. The possibilities are many, and often those located at the roots of teeth are least suspected despite the growing recognition of their frequency by medical and dental men. And even after search, many offending teeth are passed by because of their apparent harmlessness.

A tooth may appear sound, may never have been tender on pressure of biting, there may be no bleeding of the gums, pyorrhea, or sensitiveness to heat or cold, and yet it may be productive of grave physiological damage. In contrast to soft parts, teeth by their peculiar relation to bone tissue present a direct avenue for bone infection which is not so evident as in other parts of the body. So potent are these factors that even the most experienced, without technical assistance, are unable to make an accurate diagnosis, and frequently enough the condition progresses to the extent of serious and permanent injury to the organ or system secondarily involved. For the medical consultant this much can be said regarding foci located at the roots of teeth. Every devitalized tooth, every crown, and, in fact, any kind of

artificial work on the teeth should be considered as a potential focus of infection unless proved otherwise by accurate technical means and procedure. And it must be further stated that even after application of technical methods, the accurate diagnosis is not readily obtained without an adequate interpretation based on special training and experience. Never before has it been so well realized that medical and dental men must join hands in the recognition of the necessity of their close cooperation and mutual interdependence.

To show that these particular foci are solely responsible for the many ascribed conditions and are not merely provoking or associative agents, and to stimulate further interest in the search thereof, and also to indicate the method of their diagnosis and treatment, is the purpose of these reports. To this end the cases here quoted have received no form of treatment other than the removal of these dental foci, and, indeed, none was indicated.

It is to be noted that acute infections, such as rheumatic fever or influenza, will produce dental pathology. This occurs because aggressive bacteria gain an opportunity through lowered local resistance, dependent on the general body weakness, or on previous tooth trauma. Not only do these acute diseases initiate dental complications, but they also aggravate already existing but quiescent foci. During and following the recent influenza epidemics there was an enormous amount of acute symptoms from hitherto latent dental infections, e. g., partially erupted third molars, devitalized teeth, and peridental infections.

Whether latent or acute, these oral conditions should be treated as soon as discovered, since by acute infections, as before mentioned, the lowering of the general body resistance may allow them to later assert their disease-producing power and in turn cause long-standing chronic ailments. In this manner a vicious cycle easily becomes established in which an acute infection becomes the inciting factor.

DIAGNOSIS.

The diagnosis should not be made from X-ray findings alone. The electric current and transillumination are valuable aids to determine the vitality of questionable teeth. Bacteriological study will confirm the X-ray findings. The foci may be chronic or acute apical and peridental infections, of which the acute are more easily recognized and treated. It is chiefly in the latent or chronic infections that the diagnosis is more complex. The teeth may have shell crowns or large restorations which are in good condition and give no noticeable symptoms. Sometimes when devitalized by the trauma of excessive mastication or a blow they show nothing clinically but a change in shading or loss of lifelike luster.

Obviously the X-ray is the next step used. Very often these pictures are deceiving unless a careful study is made of the anatomy of the region taken. The anatomic and pathologic translucent areas are often confused as follows: The angle at which the picture is taken may show the anterior palatine foramen at the apex of central or lateral incisors. The posterior palatine foramen is sometimes shown directly over the lingual or buccal roots of molars. The mental foramen may appear at the apex of lower bicuspid.

The malar and nasal processes often obscure the apices or give a false density to surrounding bone. Elongation or foreshortening places the root ends in the maxillary sinus or obliterates a pathological area, if it be buccal or lingual to the root end. These errors can be found only by a close study of the white line made by the compact plate (peridental lamellae) of the alveolus or the translucency of the peridental membrane. If this white line is followed carefully, it will be continuous, with only slight variations, around the whole root when in correct anatomic relation. But when there is pathology present it will appear first unduly thickened and then broken or obliterated. In this way both apical or gingival pathological areas may be studied and diagnosed. In cases of long standing the wall of the abscess becomes dense in an attempt to wall off the infection. If there is no definite wall, the adjacent bone is becoming infiltrated and liquefied. When walled off the area is cystic, while in the latter case a granuloma of indefinite size or shape is formed. Around old devitalized teeth there are often seen heavy calcified areas, which are frequently interpreted as areas which have healed in. These have been shown by Pollia to be hypertrophic, due to continued stimulation by slowly progressing infection. Sections of this bone have proved to be bacteria laden and are interpreted by some as foci.

Before arriving at definite conclusions regarding the pathological significance of translucent areas a reliable dental history should be obtained. It requires from six months to a year to show new bone dense enough to be seen in the radiograph after clearing up of a focus either by medication or surgical procedures. The use of any of the strong germicides in root canal work will produce translucent areas if allowed to pass into surrounding bone tissues, and a considerable period of time is necessary to allow new bone to form. After apicoectomy the wall of the cavity is sharply defined. As bone is regenerated the cavity becomes smaller with an indefinite outline and will not show complete calcification for several months or a year. The stress of extraction may force infection out into the adjacent bone tissue, which will break down before repair takes place. All these factors must be thoroughly studied and eliminated before diagnosing the translucent area as pathological.

TREATMENT.

The treatment has been guided by the axiom that the dentist's field primarily is the conservation of teeth to fulfill their intended physiological function, and only when their retention was a menacing factor to the general health were radical measures adopted.

The patients sent to a dentist in a hospital are already showing systemic trouble, which is significant that they have lowered resistance which will not take care of any foci present. These foci should be removed in the shortest possible time and nothing left to chance.

Root-canal work will only take care of a case in which the adjacent tissues are not deeply affected. Buckley has shown that large granulomata can be treated by conscientious root-canal technique, but advises later surgical removal should there be any doubt concerning the influence of this upon the general health of the patient. He leaves such decisions to the individual operator and suggests that the requirements of the case in hand indicate the remedy. Some work with the use of stains, such as 1 per cent methyl violet, 1 per cent brilliant green, plus 1 per cent crystal violet in 50 per cent alcohol, is being done but is yet in its experimental stage. Howe's silver-nitrate treatment has been in use for some time with varying results.

The most thorough and positive treatment, however, is surgical. Apicoectomy of single-rooted teeth has been proved by Thomas(1) and others to be very successful and is indicated where the abscess extends so far that drainage and medication will not be thoroughly sufficient through the root canal.

If there will not be at least two-thirds of the root left after amputation, extraction must be resorted to. At the time of amputation, when conductive anesthesia is used, the operator fills the root canal with hot gutta-percha coated with eucalyptol. This insures thorough filling of the root canal, both as to length and diameter. Under general anesthesia the cavity can not always be kept dry enough for root-canal work, so that this must be done either before or after the operation. It has been often observed that a semisolid mixture of gutta-percha and a solvent shrinks in diameter when the solvent is absorbed. Therefore the canal should only be lightly moistened with the solvent and warm gutta-percha placed in the canal with considerable pressure.

The abscess area is packed and drained when very large or when currettement is not complete. It is considered better to drain and irrigate daily when the membrane of the antrum is exposed than to curette deeper and probably perforate the antrum membrane. When currettement is thorough the wound may be irrigated with salt solution and closed. A clot in the bone cavity greatly assists in granulation, and the use of strong germicides or antiseptics in

the bone cavity is contraindicated. Curettement should include a considerable amount of adjacent bone tissue which, though comparatively compact, may be so infiltrated that repair will be impeded or may be prevented.

When extraction is indicated it should be followed by curettement of the adjacent tissues. It is often impossible to curette a granuloma through the small opening left by simply extracting the root. This may be done by removing the buccal plate, thus preventing trauma in extraction and making the apical area easier to approach and instrumentation more thorough. The soft tissue will fill in such an opening and assist in closing and healing the wound. In extensive extraction the soft tissue buccally or lingually should be retracted and the bone tissue removed with the tooth, roughened edges and infected interproximal septa removed and smoothed down. This allows more thorough curettement and helps to form an even rounding alveolar ridge when healed. The buccal and lingual flaps of soft tissue are united by stitches if necessary; and the wound heals more readily and without painful projections of sharp bone into the overlying soft tissue, presenting an ideal, firm ridge for the application of prosthetic appliances.

CASE REPORTS.

CHIEF PETTY OFFICER. AGE, 40.

Complaint: Intense headaches and frequent urination; puffy, edematous, lower eyelids.

Duration: Two years.

Diagnosis: Chronic nephritis.

Past history: Appendectomy eight years ago; influenza.

Physical examination and findings: Moderately well nourished, no edema of ankles, no arterio-sclerosis. Urine, scanty; 400 c. c. in 24 hours; sp. gr. 1035; heavy cloud of albumin; many hyaline and granular casts. W. B. C. 8,500. Blood pressure, 160-75. Wassermann negative. Teeth in very poor condition with a great deal of artificial work.

Dental examination and treatment: Clinical examination showed an extensive case of suppurative pericementitis, caries, and broken roots. Radiographs showed seven apical abscesses and extensive absorption of interproximal bone. All teeth were extracted and curetted, with the exception of the lower bicuspid and cuspid. The interproximal bone and parts of the lingual and buccal plates were removed so that the soft tissue could be united as previously described. Nitrous oxide and oxygen anesthesia was used.

Course: Results promptly appeared. There was relief from the headaches and dizzy spells in the first 24 hours. At the end of two

weeks urinary output was 1,400 c. c. in 24 hours, with only a slight trace of albumen. Urinary output and findings were normal in four weeks. Blood pressure 125-75.

A HOSPITAL CORPSMAN. AGE, 21.

Complaint: Mild dyspnea, palpitation, and extra systoles.

Duration: Six months.

Past history: Mumps, chicken pox, tonsillitis, mild attack of influenza.

Physical examination and findings: Well nourished. Left border of heart enlarged to 2 cm. to the left of nipple line. There was a soft systolic murmur and slight edema of ankles on standing. Heart rate 80-90. Tonsillectomy had been done a long time previously. There were short periods of an afternoon fever of 99.5. Tincture of digitalis had been used freely with no results. W. B. C. 12,000; poly., 81 per cent; s. l., 19 per cent. Teeth appeared sound and healthy.

Dental examination and treatment: Clinical examination showed teeth in excellent condition. The lower left first molar had a very large gold inlay and the lower right central incisor was slightly discolored. Radiographs showed the molar had been devitalized and the root canals partly filled. There was a large translucent area at the apex. The lower central also showed a marked apical translucency, probably due to the trauma of excessive mastication. The molar was extracted and curretted, and the central amputated and ground down to relieve occlusion.

Course: Patient was returned to duty in five weeks with a normally functioning circulatory system. He was free from dyspnea and palpitation, even on the most severe exertion. The murmur and cardiac enlargement disappeared, and the heart tones were sharp and of good intensity. This patient was seen one year later, enjoying the best of health, and had climbed a mountain 8,000 feet high without the least physical distress.

PAYMASTER. AGE, 24.

Complaint: Dyspnea, chest pain, weakness.

Duration: Three months, with gradual onset.

Diagnosis: Pleurisy, with effusion.

Past history: Mumps, measles, chicken pox in childhood. No history of chronic chest disease, night sweats, hemoptysis, or any affection indicating tuberculosis.

Physical examination and treatment: Moderately well nourished. Entire right chest posteriorly and in axillary line gave signs indicating large amount of fluid. Patient had had tonsillectomy some time

previously. Sputum repeatedly negative for tubercle bacilli. Teeth in very poor condition. Several filled and crowned. 1,000 c. c. of clear fluid were aspirated from right chest. Guinea pig, after inoculation, was negative for tubercle bacilli.

Dental examination and treatment: Examination showed practically every tooth had been either filled or crowned. There were several overhanging fillings which were irritating the gingiva. The gingiva around the porcelain-crowned teeth was in good condition; as these were well fitted with cast-base restorations. The upper left lateral and cuspid appeared fused. A gold shell-crown on the upper left first bicuspid was irritating the gingiva. Radiographs showed pockets around overhanging fillings and granulomata at the apices of the upper left lateral and cuspid and upper right lateral. Both lower third molars were badly impacted and showed pockets distal to the second molars. The upper left cuspid was shown impacted against the roots of the fused lateral. The double-rooted lateral and impacted cuspids were removed. The right lateral was amputated. All overhanging fillings were replaced or refinished and the gold crown removed so that no further gingival irritation remained. Both lower third molars were extracted. Conductive and infiltration anesthesia were used entirely.

Course: Patient rapidly improved, gained 6 pounds, and was returned to duty after 30 days, having had no recurrence. He was seen and examined six months later. There had been no recurrence; he maintained his gain in weight; was perfectly well and taking part in minor athletics. Roentgen-ray examination of chest at this time showed slightly thickened right pleura, right lung clear; in left lung a few hilus glands.

RETIRED OFFICER. AGE, 67.

Complaint: Chronic dry eczema over anterior surfaces of arms and legs.

Duration: Seven months.

Diagnosis: Eczema.

Past history: Negative.

Physical examination: Negative. Well nourished. Teeth appear negative; slight gingivitis; few fillings. W. B. C., 9,000; poly., 62 per cent; s. l., 34 per cent.

Dental examination: No caries. Gingiva slightly irritated by salivary calculus. Upon pressure pus exuded from between upper central incisors, which were separated about 3 mm. Probe passed about one-third of roots' length. Radiograph showed granuloma at apex of upper right first bicuspid and two pyorrhea pockets, one between the upper central incisors, the other distal to the lower left

lateral incisor. The upper first bicuspid was extracted and alveolus curretted. The gingival pockets were curretted and some serumnal calculus removed from the tooth roots.

Course: Definite improvement in skin condition was noted in one week. Patient left hospital well in three weeks.

SEAMAN. AGE, 22.

Complaint: Acute inflammation of left knee and ankle joints with swelling.

Duration: Acute arthritis.

Past history: Mumps, chicken pox, rheumatism in childhood, and influenza in 1918. No venereal history.

Physical examination: Left knee swollen, tender and painful, left ankle joint likewise. Fever 101 to 102 for past six days. W. B. C., 12,600; poly., 64 per cent; s. l., 30 per cent. Tonsils removed some time previously. Teeth appeared sound.

Dental examination and treatment: Teeth showed some caries which had devitalized three teeth. Gingiva appeared in good condition with only slight deposit of calculus at lingual of lower anterior. Radiographs showed marked granulomata at apices of upper right first molar, first bicuspid, and upper left first molar; these teeth were extracted and alveolus curretted.

Course: Fever dropped to normal the next day, with a slight rise to 99.5 for two days in the afternoon only and none thereafter. Swelling, joint tenderness, and pain rapidly subsided so that patient was discharged to duty in two weeks.

DISCUSSION.

There are records of patients with nonvital pulps where there was no radiographic evidence of apical complications in which removal of the foci improved their health. Other records show marked radiolucent areas with no systemic or local evidence of infection. "The argument that patients may have apparently good health regardless of devitalized teeth with radiolucent areas is both true and untrue, because (a) through resistance or immunity, the patient is well as long as bacteria gain no ascendancy over natural resistance; (b) it is usually during the innocuous period that the general practitioner has occasion to see the patient." (2)

No temporizing in serious cases should be considered. Half-hearted work leaving any septic areas avails nothing. Very often patients are loath to allow complete radical work because of cosmetic or utilitarian scruples, stating that the involved teeth have never caused them any trouble. So often a patient's life may soon be at stake that one had better err in removing a possibly reparable

tooth than leave a diseased focus in situ, to which the patient is daily giving proof of his susceptibility.

REFERENCES.

- (1) Oral Abscesses. Thoma.
- (2) Machat. B. B. Significance of Pulpless Teeth in Health and Disease. Dental Cosmos, Vol. LXII, No. 3.

VALUE OF BLOOD TRANSFUSION IN MEDICAL CASES.

By D. H. MURRAY, Lieutenant, Medical Corps, United States Navy.

It is the purpose of the writer in this article to set forth some indications for the treatment of medical cases with blood transfusions.

Blood transfusion for the treatment of cases suffering from hemorrhage, where great quantities of blood have been lost at one time, or where small quantities have been lost many times, has been used very effectively. This method has been used in the treatment of anemias with varying results, but generally it brings about temporary improvement at least.

The cases that I have in mind, those that derive great benefit from transfusions, are the ones that have been suffering from infection for some length of time with a resulting anemia. These infections may be evinced by any form of arthritis, endocarditis, malaria, or nephritis. Of these types endocarditis and malaria cause the most severe anemia. Of course, in these cases the focus of infection should be found if possible and removed.

These cases may be found at any age. The patient will appear thin, pale, and anemic, not jaundiced, usually without much rise in temperature, and the spleen not enlarged.

The blood picture is about that of a secondary anemia, with a Hb. of 30 to 40, color index well below one; R. B. C., 2,500,000 to 3,500,000; W. B. C., 12,000 to 16,000; differential count about normal with some normoblasts; and reticulated red blood cells 2 to 5 per cent. The red blood cells are not much altered in appearance, the platelet count increased some, perhaps to 275,000, and the hemolysis in NaCl normal.

After a suitable donor has been found by the crossed hemolysis tests, these cases should be transfused at once, giving from 200 to 500 c. c., according to the severity of the case and the strength of the patient.

It may be necessary to give several transfusions, depending upon the condition of the case. They can be given at weekly intervals and in increasing amounts, if the amount given in the beginning was small.

By following these blood pictures from treatment to treatment in these cases improvement can be seen; also the general condition of these patients improves. This treatment has been used on such cases in this hospital with very gratifying results. It seems that the transfusions help the general condition very markedly, and by so doing the patients are better able to combat their infections.

This may be due to the protein that is introduced or to the increased number of antibodies that the injected blood carries.

In secondary anemias from any cause, or in the chronic aplastic anemias, much permanent value is derived from the use of transfusion. It is also of value in the treatment of other forms of anemia, producing at least temporary improvement.

THE POSSIBILITIES OF A DENTAL BRANCH OF THE HOSPITAL CORPS.

By B. F. LOVEALL, Lieutenant, Dental Corps, United States Navy.

For some time, due to the pioneer work of Fones and others, the dental profession has been actively interested in the problem of preventive dentistry. Every practitioner has done his utmost in a more or less haphazard way to further this cause. It soon became evident that this was a field in which the dental hygienist could assist the general practitioner and under supervision take care of the bulk of the school and health-center work. We have in the Navy an opportunity to develop a personnel analogous in its function to the dental hygienist. It seems most logical that certain members of the Hospital Corps of the Navy could be trained in this branch of preventive medicine.

Dental surgeons are located at strategic places where the facilities are the best and where the Navy personnel is working in large groups. With a changing personnel, the actual pro rata of men under the care of the dental surgeon far exceeds the numerical strength of the unit upon which the number of dental officers is computed. Usually the entire time of the dental surgeon is taken up with relief and restoration work. For this reason little or no educational or preventive work is being carried on, except with the actual patients treated. If hospital corpsmen and recruits were given more instruction as to the proper care of their teeth, a large percentage of the pathological conditions found later would be avoided.

As stated before, the dental surgeons are now only able to do the relief and restorative work. In fact, they should be relieved of most of the prophylactic and dental-inspection duties. Why not follow and enlarge upon the plans of the oral hygienists who have already proved the usefulness of prophylaxis and regular dental inspection in public schools and health centers. This could be done

with very little effort by creating a dental branch of the Hospital Corps. All hospital corpsmen should be given instruction as to the care of their teeth during preliminary training. They should be instructed both theoretically and practically in dental prophylaxis, so that they could do this work while on independent duty.

When they become pharmacist's mates certain of them could be given intensive practical training such as is given in school for dental hygienists. They would then be fit to do routine examination of all men at regular intervals. This examination should be entered on the health records and should be made as compulsory as in the case of smallpox or typhoid prophylaxis. Simple scaling, polishing, and instruction to the patient concerning the individual care needed and the classified notation of any defects would present an ideal case for the continuation of treatment by the dental surgeon.

Students of preventive dentistry and preventive medicine have been working for years toward the prevention of the unnecessary dental complications, varying from caries and mild gingivitis to focal infections due to apical and peridental pathology. The Navy becomes an ideal field for the practice of this preventive treatment, providing the work is systematized, and a competent corps of assistants to the dental officers is developed. The educational work in the Hospital Corps school and training camps could be done with large papier-mâché models of the upper and lower denture and individual teeth supplemented by illustrated lectures. Toothbrush drills are just as essential in training camps as in the preparatory schools, where they have been in vogue for some time. Inspection of dental equipment of enlisted men should be included with other personal inspection. The educational campaign should also include talks on diet. For years it has been believed that caries of the teeth was caused by the chemical action of lactic acid upon the cementing substance of the enamel rods. And further that this lactic acid is produced by bacterial action on starches and free sugars. While susceptibility and immunity from caries is still under investigation it is believed by Fones and others that the "excessive consumption of free sugar is the most important factor in creating susceptibility." Fones further states that "We know first that the bacterial plaque is the initial stage of dental caries, and that frequent removal of these plaques from all the surfaces of all the teeth by hand polishers is the most efficient means, aside from a correct diet, for the prevention of dental caries. Second, that the frequent removal of all calcareous deposits around the necks of the teeth, by the use of instruments, is most effective in the prevention of infection and destruction of the dental tissues surrounding the roots of the teeth. Third, that the faithful use, daily, of the toothbrush and floss silk and of a mouth wash, such as lime water made

from coarse calcium oxide is the best means known for the thorough removal of food débris and dissolving the plaques. Finally, that nearly all microorganisms in the human mouth are harmless if deprived of a pabulum, such as food débris, upon which to feed, develop, and multiply. Now, if these are facts, how shall we make a practical application of them to aid the populace in preventing dental caries, pericemental infections, and in appreciating the importance of clean mouths and sound teeth? The answer, in my judgment, is by means of the dental hygienist * * *."

To summarize the thoughts presented in this paper:

1. The dentist as a guardian of oral health can in no way disregard preventive measures as a part of daily practice.
2. The prevalence of dental caries should be minimized by systematic oral prophylaxis and examination by or under direction of the dentist.
3. If other professional duties prevent the dentist from giving this service, he should acquire trained assistants.
4. The dental hygienist should be properly trained and his duties limited and supervised.
5. The dental hygienist is an important factor in the progress of preventive dentistry.

REFERENCES.

1. Fones. Oral Hygiene in Relation to Public Health. N. Y. Med. Jour., April 17, 1920.
2. Stevenson. The True Case of the Dental Hygienist. Dent. Cosmos, Vol. LXII, No. 8.

A CASE OF ACUTE TUBERCULOUS PERICARDITIS.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, United States Navy.

The patient was a tall, fairly well-built youth of 18, who had attained the bulk of his growth during his last three years, and who, even previous to the onset of his illness, had been only moderately well nourished. He was admitted to the hospital June 4, 1919, with a mild broncho-pneumonia, which had followed one of a number of attacks of acute bronchitis, to which he recently had been somewhat subject. Fever rose gradually from 90° in the morning to 102° in the afternoon, with a soft pulse, which was generally about 110, and respirations about 28. There were scattered areas of consolidation over both lung bases, with harsh breath sounds and patches of bronchial breathing.

The family history was entirely negative for tuberculosis or chronic intoxications, the father, mother, two sisters, and one brother all being alive and well. In the past history the general health had

always been good, excepting for measles at 5 and whooping cough at 7, from which the recovery was rapid and free from complications or known sequelae. He was not subject to chest colds, to winter coughs, to great variations in weight, nor to any other indications of chronic chest disease. There was no history of severe or long-continued tonsillitis, nor of any signs or symptoms referable to the circulatory system prior to onset of the present illness, such as precordial pains, dyspnea, palpitations, or edema. The urinary system was normal.

There was no history of venereal disease. His residence up to his enlistment in the fall of 1918 was in Pennsylvania, his occupation that of a garage worker. The patient contracted his first severe attack of acute bronchitis through exposure in the early winter of 1918 while at Great Lakes Training Station and allowed this to become fairly deep-seated before reporting at sick call. Recovery, however, was uncomplicated. In April, 1919, following a mild contusion, fluid developed in the left knee, which cleared up without aspiration. On his arrival on the Pacific coast during the late spring of 1919, he again contracted a severe attack of acute bronchitis, for which he did not report at once for treatment and from which he seems to have made a complete recovery.

Very shortly afterwards came the present illness. Physically he was considerably undernourished and dyspneic. He preferred to sit up in bed, and had a pinched, anxious, expression. The skin was of a dusky hue, teeth sound, tonsils apparently normal. He had a dry, irritating cough. No pulsations showed in the neck; the clavicles and ribs were prominent, abdomen negative. The apex beat was felt in the sixth space in the nipple line; the upper margin of cardiac dullness in the third space, the right, under the sternum. The heart sounds were regular, somewhat soft, and of moderate intensity; no murmurs or adventitious sounds were heard. Blood pressure systolic, 108; diastolic, 60. White blood-cell count 10,700: Polymorphonuclears, 79 per cent; small lymphocytes, 16 per cent; large lymphocytes, 4 per cent; transitionals, 1 per cent. The urine was normal, the blood Wassermann negative, the sputum negative for tubercle bacilli at this time, but did show Type IV pneumococci.

During the first two weeks a dry pericardial friction rub appeared over the middle of the precordia. He became weaker, slept a great deal, and the dyspnea and cyanosis increased slightly. Fever gradually increased, so that a daily swing from 98° to 104°, with a rather sharp rise occurred at the end of the first month's illness. Pulse, 110–130; respirations, 30–40. Blood culture on several occasions was negative. Small amounts of fluid were removed from the pleural cavities of both lungs, principally from the left—on one occasion

750 c. c. This fluid was sero-sanguineous, often deeply hemorrhagic, and coagulated quickly. Tubercle bacilli were never found. The albuminous content was 1.2 per cent, with a white-cell count of 10,700: Polymorphonuclears, 75 per cent; small lymphocytes, 23 per cent; large lymphocytes, 2 per cent; and many red blood cells. The patient was apathetic, listless, and drowsy most of the time. Under supportive treatment of forced nutrition and digitalis, there was slight improvement. The blood pressure remained about 100 systolic and 60 diastolic. A decrease of 2° of fever occurred. The white-blood count remained as on admission. The heart tones, however, during the middle of the second month became distant, soft, and muffled, the friction rub loud and distinctly audible over any part of the left chest in front. Pain was complained of in the precordia and within the chest. The area of cardiac dullness had become considerably enlarged, reaching to the second rib space above and 5 cm. to the left of the nipple line, the right border being under the sternum.

Fifty c. c. of clear hemorrhagic fluid which coagulated in a few minutes on standing were aspirated from the pericardium. A few days later 200 c. c. of similar fluid were removed. The laboratory reported: Polymorphonuclears, 54 per cent; small lymphocytes, 23 per cent; large lymphocytes, 3 per cent. There were many red blood cells; the albumin content was 1.2 per cent. Smears showed great numbers of tubercle bacilli. A short time later fluid appeared in the abdomen and there was well-marked edema of the ankles and skin in general. Cardiac palpitations and extra systoles were not infrequent on the slightest exertion.

During the third month 50 c. c. of fluid was again obtained from the pericardium. In this likewise many tubercle bacilli were found. Tubercle bacilli were now found in the sputum for the first time. The abdominal fluid increased greatly; 3,500 c. c. were removed in which no tubercle bacilli were found. The liver was enlarged 5 cm. below the costal margin and the edge was tender.

At the end of three and a half months only a degree of fever still persisted, and there was so much improvement in the general physical condition that, at the urgent request of the boy's parents, he was removed to Colorado, from whence he was taken to his home in Pennsylvania. He suffered a relapse and death occurred after four and a half months of illness. It is unfortunate that there are no necropsy findings to record.

It is interesting to note that during the entire course of the disease the blood pressure in millimeters remained usually 10 to 20 points below the pulse rate, an illustration of poor prognosis as indicated by Gibson's law in pneumonia. Tuberculous pericarditis is not nearly so rare as was formerly supposed; however, the finding of

tubercle bacilli is, comparatively speaking, not frequent. Laënnec is recorded as having described the first case in 1831. The frequency of the condition is variously stated to be from 5 to 7 per cent in tuberculous individuals. Osler believed it to be second only to rheumatic fever. Norris¹ in his series of cases gives no difference of incidence as to race or age, but one of 8 to 1 in favor of males. Primary tuberculous infection of pericardium is thought to be rare and its existence all but denied.

There are many cases reported in the literature of complete recovery by the surgical treatment of pericardiotomy and drainage. However, none were noted in which actual free tubercle bacilli were mentioned as found. Treatment by pneumo-pericardium is also mentioned. The largest amount of fluid obtained in a single case during life is 2,790 c. c. and at necropsy 4,000 c. c.

A CASE OF ACUTE ANILINE POISONING.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, United States Navy.

On Sunday afternoon, February 14, 1920, the patient, aged 24, a man in excellent health, made some chocolate in his quarters from a standard commercial brand of this article. In order to prevent the steam from escaping he covered the saucepan for a period of 20 minutes with a plain printed, uncolored, magazine in common circulation. He noticed the beverage had the peculiar taste and odor of printed matter, but nevertheless drank a little more than two cupfuls. About midnight he was nauseated and experienced slight abdominal distress. In the morning and during the day following he had occasional attacks of nausea and vomiting, severe, throbbing headache, and profuse, watery stools, with tenesmus. This continued until late at night, and on Tuesday, the third day, the symptoms abated somewhat. Early Wednesday these symptoms recurred with increased severity, the vomiting, diarrhea, and tenesmus became marked. There was evident cyanosis and prostration, with violent headache, vertigo, and staggering gait. The patient was brought into the hospital late Thursday afternoon, the fifth day of his illness, in a condition of definite shock.

The face was highly colored, a deep, purplish bronze. In the mucous membranes the color was even more intense. Throughout the body the bronzing was apparent, and the ears, fingers, and toes were especially cyanotic. The eyeballs were prominent, the orbits sunken, and the conjunctival vessels injected and cyanotic. The skin was cool, dry, and imparted an inert, soft, leather-like sen-

¹ Norris, G. W., Univ. Pen. Med. Bull., vol. 17, 1904-5, p. 158.

sation on palpation. The peripheral vessels were flattened and hardly palpable. The pulse was slow, small in volume, but regular. The respirations were shallow and sighing in type. Pupils were widely dilated, equal, and reacted slowly. There were no ocular or facial muscle palsies, the deep reflexes were subnormal, the superficial ones absent. Frequent vomiting of green, liquid material, with a fecal odor and containing a brown sediment occurred. The stools were frequent, small, and watery, with an offensive odor and contained mucous shreds.

The scaphoid abdomen, sunken far below the costal margin, was of a dry, dead, doughlike consistency. No signs of spasticity, tumor mass, or localized tenderness could anywhere be elicited; neither was any tympanites present, nor any borborygmi to be heard. The skin was everywhere decreased in sensibility almost to anesthesia. Temperature, 101.6; pulse, 88; respirations, 20. White blood cells, 7,500; Polymorphonuclears, 75 per cent; small lymphocytes, 13 per cent; large lymphocytes, 7 per cent.

Previous family and personal history were negative. He had never had any attacks referable to the gastro-intestinal tract. Heat was applied to the body, and further treatment consisted of a teaspoonful of very hot water every half hour, astringent enemata and opium pills. Analysis of gastric washings showed an excessive amount of mucus but nothing more. The urine was scanty in amount, dark colored—but not smoky—and highly acid with a small amount of albumin. The eye backgrounds were pale but otherwise normal.

On the succeeding days prostration increased with gradually lowering vitality. Restlessness and inability to sleep were followed by a mild delirium. The cyanosis deepened as the pulse became weaker and smaller. The stools contained a few pus cells and occult blood, but no parasites, ova, or bacteria. Fluoroscopic examination of a bismuth meal showed marked spasticity of the pylorus and of the pyloric antrum. Practically nothing passed into the duodenum until a few hours later, when a little bismuth was found in areas along the small intestine and in the ascending colon. Considerable bismuth still remained in the stomach even after six hours. The bismuth had a quieting effect, for the vomiting subsided at once and did not recur.

The treatment consisted of a little hot tea at close intervals, and shock enemata. On the eighth day, the fourth after admission, temperature dropped to 94.4 during the night, pulse 90. The respiration was 18; slow, shallow, and slightly Cheyne-Stokes in type. The patient was very low, with weak pulse, barely palpable at the wrist. Blood pressure: Systolic, 100; diastolic, 70. He was stuporous, partially unconscious, and aroused only with difficulty. There was paral-

ysis of the bladder for the next two days. Urine obtained by catheter was highly acid, smoky, and amounted to only 3 and 4 ounces, respectively, for each of the 24-hour periods. Urinalysis showed a heavy cloud of albumin, but no red blood cells or diacetic acid. There were many round epithelial cells and finely granular casts. Tests for phenol were negative. Evidently urinary suppression was at hand and fatal collapse seemed imminent.

Prompt antinephritic treatment was instituted. From 500 to 1,000 c.c. of Fischer's solution were given intravenously daily, and alkaline drinks were urged. Hot, moist, blanket packs twice daily produced little reaction for several days, but eventually were very efficacious. Phenolsulphonephthalein test: First hour, 15; second hour, 30; total, 45 per cent. The fluid output of the kidneys was gradually increased until four days later it totaled 2,210 c. c. for 24 hours, and there was beginning definite improvement. The diet, at first the most bland, was gradually increased as the urinary findings improved. The temperature, however, for the entire course of the illness remained subnormal, usually under 97° , except on two occasions, when it rose to 101° , for which no cause could be found.

The gain in weight and strength was rapid. The cyanosis and skin discoloration promptly cleared up. The urine became quickly normal, and on March 16, 1920, the patient was discharged from the hospital well, after a 30-day illness. He had been on a full diet and regular exercise for over 10 days with normal urinary findings, including those by the phenolsulphonephthalein test.

It was early realized that this was a case of acute poisoning affecting the gastro-intestinal tract, circulation, and kidneys. The nature of the poison, however, was not at first apparent, for while the smoky urine seemed a clue, all tests for phenol in the urine were negative. A few pages from the magazine which he had used in preparing his chocolate were steeped in a boiling chocolate mixture. This was found to be free from phenol, but aniline was readily detected by the chromic acid test. A concoction made from the pages and water did not give a positive test, so that it would seem probable that some of the chemical components of the chocolate are able to liberate aniline to the extent of affecting the chromic acid test.

It might appear that the amount of aniline that would be thus ingested would be very small; however, aniline is a very powerful poison, less than 30 c. c. being stated as a lethal dose for man. Aniline is freely used in black printing inks, especially those in which a permanence of the glossy black is desired. There are many cases of chronic aniline poisoning on record and a few acute. Nearly all of these, however, are among industrial workers, the greatest number, by far, being those employed in the rubber industry.

REPORT OF A CASE OF TUBERCULOUS MENINGITIS.

By J. J. SALE, Lieutenant, Medical Corps, United States Navy.

—Coxwain, U. S. Navy, was admitted to the U. S. Naval Hospital, Mare Island, Calif., as a stretcher case on April 7, 1920, complaining of a severe generalized headache, dull pain in the chest, and general malaise. His temperature at this time was 102 F., pulse 72, respirations 18. An indefinite history as to onset was obtained. Physical findings showed a few scattered moist râles throughout the left chest. The laboratory reported 8,900 leucocytes. Urine showed a trace of albumin. His condition remained unchanged for nine days, save for an afternoon rise in temperature to 101.

On April 16, without previous signs or symptoms, evidence of fluid in the left chest was elicited. Thoracentesis was performed, yielding 500 c. c. of clear, straw-colored fluid. Laboratory report on fluid was as follows: Few Gram-positive diplococci present. No growth on culture. No pus cells. Guinea pig inoculated (pig later died of a peritonitis). Diagnosis then changed to pleurisy, serofibrinous. Following the thoracentesis, patient showed some improvement, but continued to have his afternoon rise in temperature. Physical examination at this time showed numerous crepitant and subcrepitant râles over entire left chest, decreased vocal and tactile fremitus. Stereoscopic X-ray plates showed evidence of pulmonary tuberculosis, left chest.

Symptoms became more pronounced on May 10, and patient continually supported his head with his hands. Leucocyte count at this time was 12,250, 81 per cent polymorphonuclear leucocytes. The following day the laboratory reported the presence of tubercle bacilli in the sputum by means of the antiformin concentration method. Following this the diagnosis was changed to tuberculosis, chronic pulmonary. On May 15 patient became irrational and gradually went into a state of coma. He presented signs and symptoms of meningeal involvement. Spinal puncture was performed and a clear fluid under pressure was obtained. The laboratory reported as follows: Globulin positive by both Nonne and Noguchi methods. Cell count 117, with small lymphocytes predominating. Guinea pig inoculated (subsequent report on guinea-pig inoculation stated cerebro-spinal fluid was positive for tubercle bacilli). Patient gradually grew worse and expired May 17, 1920. The pertinent autopsy findings in this case are as follows: Left lung adherent to parietal pleura throughout. Few millet seed nodules evident in pleura of lower lobe. Right upper lobe contained several fibrous areas. No cavities or caseated areas present. Peribronchial glands enlarged and firm. Right lower lobe slightly adherent at base. No fluid in thoracic cavity. Meninges contained a small amount of grayish-colored fluid,

which was especially marked around the blood vessels. Upon examination of this fluid no tubercle bacilli were found, while the cellular element of the fluid was composed almost entirely of small lymphocytes. The remaining organs were negative pathologically. Microscopical sections of the involved organs showed the characteristic lesions of tuberculosis to be present.

Conclusions: Pulmonary tuberculosis complicated by tuberculous meningitis.

A CASE OF NEUROPARALYTIC KERATITIS.

By C. N. MEADOR, Lieutenant, Medical Corps, United States Navy.

The reason for reporting this case is that such cases are infrequent in occurrence and there is likelihood of making the wrong diagnosis. Outlining what is considered to be the proper treatment and the prognosis in such cases will be of interest.

A civilian, aged 40, employed in the United States Navy Yard, Mare Island, Calif., for the past nine years as a dock worker, repairing docks, and docking and undocking ships. During this time he was never sick. He was admitted as a patient to this hospital May 7, 1920, with what appeared to be an injury to the right eye. It appeared from the first examination that possibly he had received an injury but no external or internal lesions were observed. He stated that his eye suddenly began to pain him while at work and, as he described it, got red. According to the usual routine a smear and culture were taken from the nose and throat and he was found to be a diphtheria carrier. He was then transferred to the diphtheria ward for treatment with only irrigations of warm, sterile, normal saline and antiseptic solutions. At the end of 12 days he was transferred back to the eye ward free from the diphtheria organisms.

The second examination revealed a marked congestion of the conjunctiva and signs of a ciliary inflammation with a tendency toward sloughing of the corneal epithelium. It was noted then that all sensation of the cornea was absent. This at once suggested atrophic disturbance. On further questioning the patient, he admitted having been troubled with neuralgic pains over the whole right side of his face, dating back about four months, not marked in severity and at no regular intervals; however, it was more marked at the onset of his present condition.

It is evident from this that there must be a lesion somewhere in the fifth nerve, probably, no doubt, in the ganglion of the fifth nerve.

The etiological factors causing such a condition are syphilis, exostoses in the foramen ovale, and rheumatic conditions. The fact that he was a diphtheria carrier was considered to be coincident

with and not a causative factor of his condition, as the organisms were found to be benign in character. Repeated Wassermann tests were made, each time negative. One Wassermann was taken after an injection of salvarsan had been given, but with negative results. This ruled out the probability of syphilis. X-ray plates were made, but no bony growths were noted around or in the foramen ovale. Then the only possibility left to be considered was a rheumatic condition, for he has been working for a number of years in damp places, which predispose to rheumatism. He states, though, that he has never had a definite attack of rheumatism, but did have some shoulder pains two months before the onset of his present condition.

The treatment carried out in this case, after the patient returned from the diphtheria ward, was as follows: Put to bed; free catharsis; soft nourishing diet and salicylates internally; irrigations with warm saline solution every four hours; hot and cold compresses twice a day; atropine, 2 per cent, one drop in eye three times a day; $\frac{1}{80}$ -grain strychnine hypodermically in right temple twice a week; dionin, 5 per cent, occasionally in eye; and Fowler's solution internally. The eye was kept bandaged until the return of sensation was observed, to prevent constant irritation to the anesthetized eyeball by the constant winking of the upper lid.

The eye did not show any improvement until about two and one-half months later. In fact, at one time it looked as though a panophthalmitis was developing, but the inflammatory process gradually subsided and sensation began to return to the cornea. Vision has been good for light and objects, but he can read only large letters at a distance of 2 feet.

The prognosis in these cases is usually very bad, the mortality to the eye is said to be about 90 per cent. The usual outcome of such a case is continued sloughing of the corneal epithelium, perforation of the cornea, emitting the contents of the anterior chamber, and panophthalmitis. The outcome in this particular case will be opacities of the cornea, flattening of the cornea, and diminution of the vision.

A CASE OF VERNAL CONJUNCTIVITIS TREATED WITH RADIUM.

By W. D. HORNER, Lieutenant, Medical Corps, United States Navy.

The case history is as follows: Z. D. R., Filipino, mess attendant first class, U. S. Navy, aged 27, entered Mare Island Hospital on April 21, 1920, with diagnosis of conjunctivitis chronic. The family history is negative.

Past history: Patient was previously an instructor in art at the University of the Philippines and is a man of exceptionally good

habits and education. His past diseases include smallpox, malaria, cholera, bronchitis, and the exanthemata of childhood. Venereal disease is denied. Some burning of the eyes was noted in 1919, but relief promptly followed the use of glasses. Has been in the naval service 14 months. Present complaint is "gumming of the eyes" and dates from February, 1920. The onset was accompanied by lachrymation and crusting, worse at night. Patient was first treated by the medical officer on board the transport en route to San Francisco. Argyrol instillations were used.

Physical examination outside of the eye condition is negative. Patient is well developed and physically sound. No evidence of focal infection. The Wassermann test and urine examination are negative.

On admission to the hospital in April, examination of the eyes showed pavement-like, flat-topped papilliform elevations of the palpebral conjunctivæ, worse on the left. Fissures occurred between the individual papillae. The conjunctiva had a characteristic "skim-milk" appearance. At certain places near the margin of the lid, isolated papules appeared in the conjunctiva. The bulbar conjunctiva was normal. Most of the conjunctival involvement was limited to the vicinity of the tarsal fold.

The cornea was clear and there was no pannus nor ciliary injection. A slight serous discharge was present in the conjunctival sac.

The fundus was normal, the media clear, and pupils normal in reactions and appearance. Vision was 10/20 in each eye. A diagnosis of vernal conjunctivitis was made. Various treatments were instituted, including boric acid washes, silver nitrate, zinc sulphate, adrenalin, and ichthyol. No benefit from these remedies was noted.

About June 1, patient was seen in consultation by Dr. Walter Scott Franklin, an ophthalmologist, of San Francisco, who concurred in the diagnosis and advised radium therapy. Radium therapy was given at the University of California eye clinic in San Francisco by Drs. Franklin and Cardes. A 10-milligram gamma radiation disk was used, screened with 0.5 millimeter of silver at a distance of 1.2 centimeters from the eye. Treatment consisted in four 1-hour periods to each eye; that is to say, once a week to each eye for four treatments. A special apparatus was provided for holding the radium disk, silver screen, etc. This was placed over the eye with closed lids and held by adhesive plaster.

There was a very spectacular improvement of the conjunctivæ after one application. This improvement continued with each successive treatment. At the end of the series of four 1-hour applications there had been a disappearance of several of the conjunctival papular elevations and a decrease of the papillae in size and number. Subjective symptoms were lessened. Approximately 25 per cent of the elevations in either eye remained.

During the month following the last application of radium there has been a gradual return of conjunctival elevations. At present both eyes present an area of papilliform elevations toward the temporal portion of the tarsal fold, with several more nearer the ciliary margin.

The general condition is definitely improved, but does not approximate a cure. An additional course of radium therapy is to be given and we are hopeful of a more satisfactory and permanent result.

As our usual remedies in the treatment of vernal conjunctivitis are generally so disappointing, the advent of radium therapy, which gives so much promise, is particularly well received.

A CASE OF ACUTE MYELITIS (DISSEMINATING).

By L. E. SMITH, Lieutenant, Medical Corps, United States Navy.

Family history: Negative.

Previous history: Usual diseases of childhood; denies venereal disease; bronchitis, acute, September, 1919; was on sick list about three weeks, during which time the following laboratory reports were made: Wassermann, negative; repeated sputum examinations negative for tubercle bacillus; urine examination, negative; X-ray report negative for tuberculosis.

History of complaint: On the day prior to admission the patient had worked all day in cold rain helping to moor ship. On admission he complained of severe pain in back, in region between shoulder blades. Temperature, 103.2; pulse, 130; respiration, 22. Physical examination failed to reveal anything abnormal except tenderness of the muscles of posterior neck and upper region of spine, and slight increase in patellar reflex. On the second day no other symptoms developed and he was slightly improved; temperature, 100. On the third day the temperature was 103.6. Pain in the back was somewhat increased. Lumbar puncture was done; fluid clear and under normal pressure. Laboratory report on fluid was as follows: Cell count, 16; microscopical examination of smear and culture revealed a Gram-positive diplococcus; Noguchi positive. On the fourth day motor paralysis of the lower extremities developed, which extended upward during the day until the upper extremities were involved. All reflexes were abolished below the neck. Bladder and rectum paralyzed. In the afternoon temperature rose to 106.4; pulse, 112; respiration, 24. White blood count, 22,500. In the morning of the fifth day a marked lateral nystagmus was present. Temperature, 102 per axilla. Loss of sensation developed, which involved the

entire body, except the face, neck, shoulders, and upper chest as far down as the second rib. Consciousness remained until about an hour before death, which occurred about noon of the fifth day.

Post mortem findings.—Healed tubercles, right upper lobe. Healed tubercle, left lower lobe. Brain and meninges negative save for congestion of blood vessels.

Removed a section of the cord at about the level of the eleventh and twelfth thoracic vertebrae. On opening the canal, pure pus welled up to the surface. The cord substance was highly edematous and it was practically impossible to remove a section of the cord intact. Microscopical examination of pus and cord substance from this region showed many pus cells present and a Gram-positive diplococcus with staphylococcic grouping tendencies. Blood culture examined later the same day and taken 24 hours previously showed a similar organism to be present.

Spinal fluid: Wassermann, positive in three dilutions.

Blood: Wassermann, one plus.

A CASE OF OSTEOMA OF THE TIBIA.

By F. G. LINDE, Lieutenant, Medical Corps, United States Navy.

C. H. Seaman second class. Age, 18.

Family history: Father living and well; mother died at 40, cause unknown. No history of similar condition in family.

Past history: Usual diseases of childhood. Venereal disease denied. Laboratory finding, normal. Wassermann, negative.

Patient complained of a hard, bony-like swelling on the posterior aspect of the right leg. It had been present since early childhood and seemed to enlarge slowly as he grew older. It occasionally gave him pain and was tender to deep pressure. No history of injury.

Physical examination was negative except for the present complaint. This appeared as a hard, circumscribed, immobile tumor, apparently attached to the posterior aspect of the right tibia. Roentgenograms showed a mass of cancelous bone surrounded by cortex, about $\frac{2}{10}$ cm. in length and $\frac{3}{4}$ cm. in width, extending posteriorly and caudad from the upper posterior edge of the head of the right tibia.

At operation the mass was found to be surrounded by a definite bursa. The growth was excised, the periosteum reflected on the tibia, fresh surfaces were smoothed out, and the bursa dissected away. The incision was closed with drainage.

Within two weeks the patient was ready for duty with no disability.

A CASE OF DISLOCATED SEMILUNAR CARTILAGE.

By F. G. LINDE, Lieutenant, Medical Corps, United States Navy.

H. C. D., Hospital Apprentice first class. Age 22.

Family history: Negative.

Past history: Negative.

Laboratory findings: Normal.

Patient gives a history of having twisted his right knee while playing football about three years ago. At that time he felt a sudden sharp pain on inner side of knee, and upon endeavoring to extend his leg found that it was locked in semiflexion. After some manipulation complete extension was obtained.

Since that time his knee has become locked more than 30 times, each occasion increasing the difficulty in obtaining extension. After the last attack the leg remained in semiflexion in spite of all manipulation.

At operation a curved incision about 8 cm. long was made over inner aspect of right knee, with the leg in 90° flexion. The knee joint was incised and the internal semilunar cartilage was found to be torn and the anterior portion displaced anteriorly. This was removed, the joint was closed, and a plaster-of-Paris cast applied.

In two weeks the cast was removed and passive motion, massage, and baking of the joint were commenced. Two weeks later the patient was sent to duty well, with full motion of the knee joint.

A CASE OF COMPOUND FRACTURE OF RIGHT TIBIA AND FIBULA.

By F. G. LINDE, Lieutenant, Medical Corps, United States Navy.

E. P. H., fireman, third class; age 26; American.

Family history: Negative.

Previous history: Usual diseases of childhood. Venereal disease denied. On March 20, 1920, patient's right leg was caught between two tugs, receiving a compound fracture of the tibia and fibula with marked laceration of soft tissues and denudation of skin from the ankle to the knee. Wound thoroughly iodinated and first-aid dressings applied. Upon admission to the hospital the leg was placed in a Hodgen's splint. Roentgenogram showed compound fracture of both tibia and fibula at the junction of the lower and middle two-thirds with marked overriding of distal fragments.

In spite of early instillation of Dakin's solution a virulent gangrene developed. Due to the denudation of skin it was impossible to obtain adequate extension by ordinary methods, and on May 7, a Steinman pin was inserted through the astragalus and weights suspended.

Excellent extension and fair position and alignment of the fragments were secured, but, unfortunately, infection developed throughout the tract of the pin, necessitating its removal. Under the influence of dichloramine-T the infection of the traumatized soft parts of the leg was pretty thoroughly controlled and the skin edge evidenced a very rapid growth.

Following removal of the Steinman pin, the fragments, which had as yet undergone no union, reverted to their old unfavorable position. It was then deemed advisable to operate in spite of the slight infection which still remained. At operation, June 4, 1920, the site of the fracture of the tibia was exposed, and the ends of the fragments were freshened, approximated, and held in position by two Lane plates. The fibula was left untouched. The ankle joint was manipulated, the adhesions broken up. Dakin's irrigation treatment was renewed. The leg was placed in a Hodgen's splint and the foot held at right angles by bandages attached to the Hodgen's cradle.

Following the slight postoperative rise the temperature has been practically normal. Occasional pus pockets have formed about the site of operation, but these have cleared up readily. The patient has felt comfortable and gained in weight. Granulations have practically covered the plates, and the denuded area has decreased to about one-fourth its original size. Roentenogram on August 1 shows excellent callus formation between the two fragments, and at the present date, August 15, 1920, patient is up in a wheel chair, and light passive motion of the ankle joint has been instituted.

A DEATH DUE TO NITRIC ACID POISONING.

By G. A. GRAY, Lieutenant, Medical Corps, United States Navy.

J. S., fireman, third class, returning from a liberty in San Francisco, swallowed a corrosive poison at about 8.30 p. m., just after the ferry left the pier. When found he was foaming at the mouth, crying, and writhing with pain. He was immediately taken below and was given first-aid treatment by a pharmacist, as there were no doctors aboard. Some of the corrosive had fallen from his mouth upon his coat, burning the material and giving off a distinct odor of nitric acid. He was then given sodium bicarbonate and white of eggs and caused to vomit several times. All speed ahead had been ordered by the captain and the ferry arrived in Vallejo about 10 o'clock. The lad was then immediately taken to the naval hospital at Mare Island.

Upon his arrival at the hospital he was still conscious but was rapidly going into shock. His pain upon attempting to swallow

saliva was very severe, almost causing a convulsion with each effort. His abdomen was tensely rigid. Morphine was administered to control the pain and he lapsed into unconsciousness at about midnight. He became cyanotic during the night and his pulse grew gradually weaker until 8.30 the following morning, when he expired.

At autopsy practically all of the gross pathology was limited to the skin, mouth, esophagus, stomach, duodenum, and kidneys. An acid burn was present on his lips and down over the right side of his chin. His skin was blotchy and cyanotic. His tongue and the buccal mucous membrane had been bleached white by the corrosive. Upon opening the abdomen it was found to be filled with a thick, dark bloody fluid with considerable clot. The esophagus contained an olive-green cast, of parchment consistency, which was readily removable throughout its entire length. The entire mucous membrane of the stomach had been destroyed and in the center of the gastric cavity was a charred mass, which upon examination was found to be composed of food, blood clot, and tissue débris.

Practically all of the cardiac pouch had been eroded and in its place was a ragged hole $2\frac{3}{4}$ inches in diameter. This hole can be seen in figure A where its sides are held open by means of wooden pegs. Along the entire length of the greater curvature of the stomach and especially upon its anterior wall were found numerous erosions and perforations of varying dimensions. A fair impression of this picture may be obtained from figure B. Arrow 1 here points to the large hole seen in figure A. Arrow 2 shows part of the esophagus at the cardiac orifice held open by means of a small peg. Arrow 3 points to the duodenal end of the stomach where there was a small perforation in the anterior wall of the duodenum just beyond the pyloric sphincter. The kidneys showed marked congestion with numerous small hemorrhages scattered throughout.

TWO CASES OF NECROSIS OF THE MANDIBLE.

By B. F. LOVEALL, Lieutenant, Dental Corps, United States Navy.

The following are two cases of extensive necrosis of the mandible caused by infection of the mandibular canal resulting from abscesses at the apices of lower molars:

CASE I. CHIEF PETTY OFFICER. AGE, 45.

Presented himself with pus exuding from the socket of the lower right third molar and around the gingiva of the lower right cuspid. A bridge from the third molar to cuspid had been removed, and the third molar extracted by a civilian dentist. From statements of the

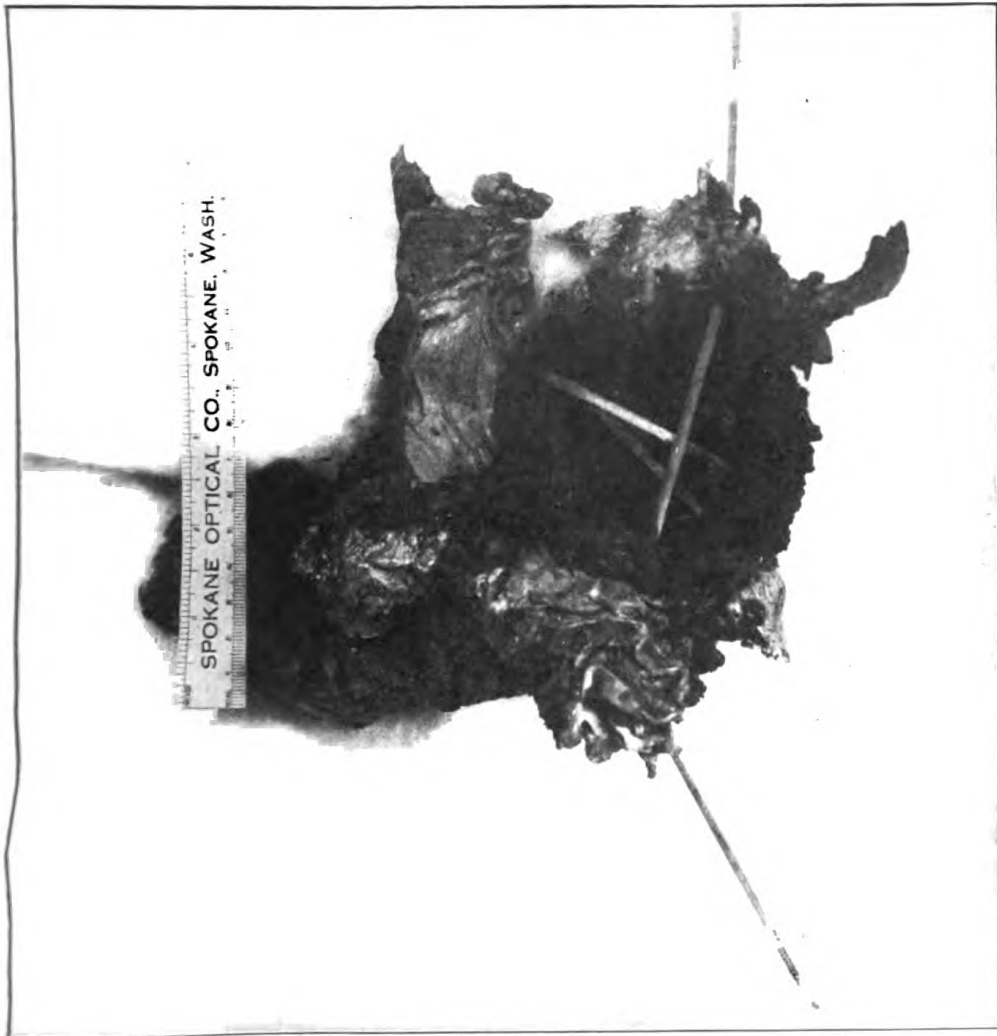


Fig. A.—Large hole in cardiac end of stomach, held open by wooden pegs.

134-1

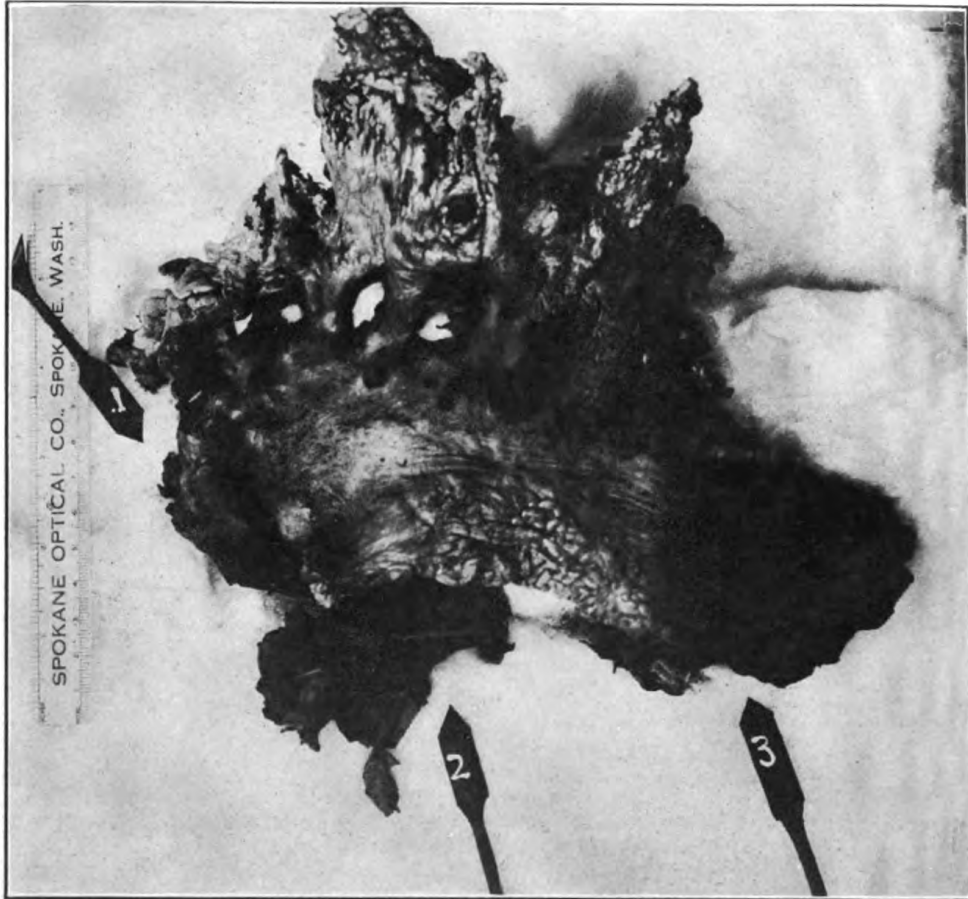


Fig. B.—Anterior surface of stomach, showing perforations.

134-2



Fig. 1.—Sequestrum extending from third molar to cuspid, from mandibular canal occlusally. Fig. 2.—Pus was exuding from gingiva of all lower molars. Fig. 3.—Teeth extracted for drainage.

134-3

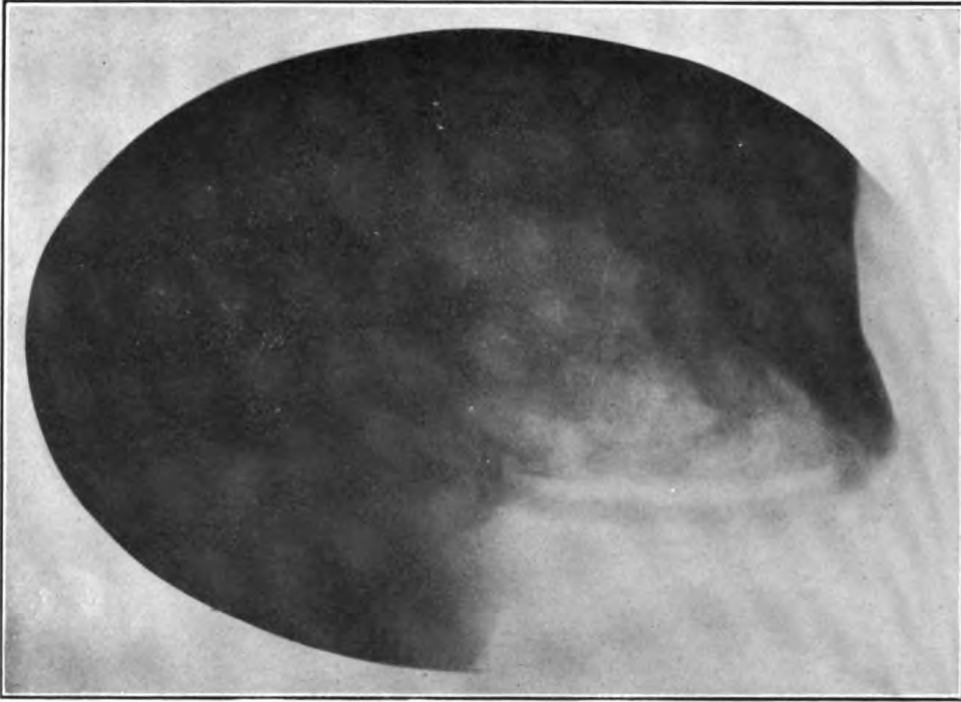


Fig. 4.—Necrosis of buccal and lingual plates

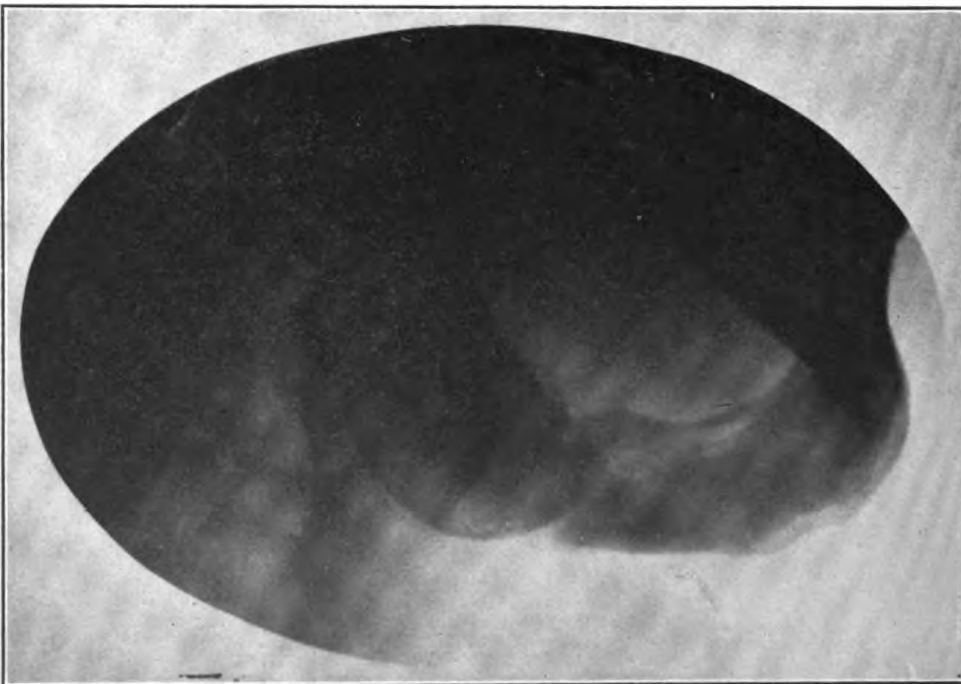


Fig. 5.—Angle and condyle separated and moving anteriorly. Regeneration of bone after removal of buccal and lingual plates.

134-4

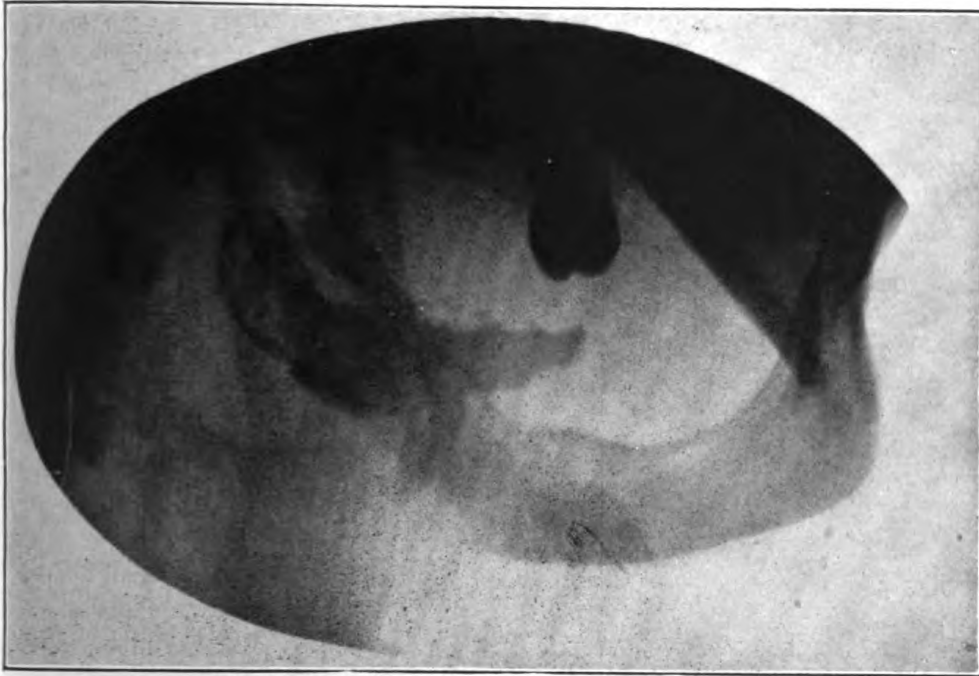


Fig. 6.—Angle removed. Condyle moving forward.

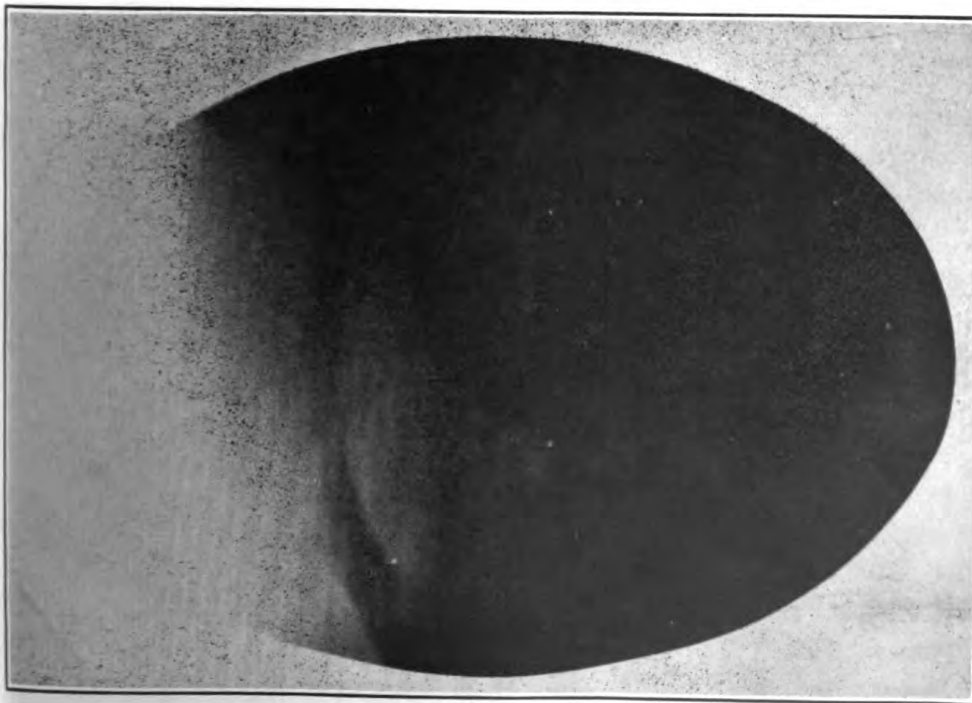


Fig. 7.—Antero-posterior view of mandible after removal of condyle.

134-5

patient there evidently had been an acute abscess present. It was also deduced from the patient's statement that infiltration and not conduction anesthesia had been used. The operator could not determine whether the mandibular canal was infected previously or by the local injection.

Curettement of the third molar socket and extraction of the cuspid for drainage limited the extension of infection and provided free drainage. The soft tissue over the ridge parted, exposing firmly attached necrotic bone. This was frequently irrigated with potassium permanganate (1-3000) and Dakin's solution; the latter irritated the mucosa and was therefore used sparingly. Antisyphilitic treatment was given following a positive Wassermann test. The pus showed streptococci in pure culture.

After about four weeks the sequestrum (Fig. I) loosened and was removed without an anesthetic. There was only a slight hemorrhage from the underlying granulation tissue with no further evidence of a continuation of the process. Patient was discharged to duty with no loss of function. X-ray examination a year later showed a marked regeneration of bone in the sequestral cavity.

CASE II. SEAMAN. AGE, 21. (FIGS. II TO VII.)

December 31, 1918. The patient was admitted to the hospital in a state of delirium with a fever of 102° ; pulse, 90; and respiration, 22. The right cheek was swollen from the temporal region down into the muscles of the neck. The surgeon made an intraoral incision in the buccal region of the lower right second molar, after which hot boric acid compresses were applied externally. When first seen by the dental surgeon edema of the soft tissues of the mouth completely obscured the lower teeth and had extended so that only the occlusal surfaces of the upper molars were visible. Pus was exuding from the gingiva of all the lower molars and through the previously made incision. Radiographs showed apical abscesses at the roots of the lower first molar, upper first molar, and second bicuspid. These teeth were extracted and an incision made along both upper and lower molars, providing free drainage. When the upper teeth were extracted pus flowed from the antrum.

January 4, 1919. Despite the free drainage provided, patient's condition became worse. The upper third molar and lower bicuspid and molars were extracted, it being evident that the canal was infected since all of these teeth were protruding from their sockets with drainage at the gingiva. Cellulitis of the whole right face and neck progressed rapidly, closing the right eye. Pressure to the cheek produced a copious flow of pus from the areas of muscle attachment on the mandible. Laboratory reported an increase of white blood cells from 20,000 to 30,000 since admission.

On the next and following days the patient had two violent chills, lasting three-quarters of an hour each. Antistreptococcus serum (20 c. c.) and normal salt solution (20 c. c.) were given intravenously. The delirium and pain had been relieved by keeping the patient under morphine. Temperature remained from 102° to 104°.

January 6, 1919. The outer canthus of eye was opened surgically to provide drainage, for the edema posterior to the eyeball was forcing the eye from its orbit. The intravenous injections of 30 c. c. of antistreptococcus serum were given twice daily for the succeeding four days. To this were added 30 c. c. of antipneumococcus serum (Type I) for intercurrent broncho-pneumonia which had developed. Pus drained freely from antrum and mandible, and the region was constantly irrigated with potassium permanganate (1-3000) and Dakin's solution.

About January 20, the edema of the eye and cheek began definitely to subside. As the cheek swelling diminished, the mandible became exposed intraorally from the third molar to the cuspid. There was no further drainage from the antrum.

January 31, 1919. Pus still drained from along the mandible. The exposed area was constantly irrigated and curetted, and a submental abscess was opened and drained. At this time there was complete anesthesia of the lower right lip, and the incisor teeth.

February 10, 1919. A large abscess which had formed in the right posterior triangle of the neck was opened and drained.

February 12, 1919. A purulent otitis media developed, which was drained and improved promptly. The mandible still drained freely, and radiographs showed the formation of a sequestrum.

March 15, 1919. With drainage considerably diminished and with part of the sequestrum loose, the lingual plate was removed from the third molar to bicuspid.

The buccal plate loosened and was removed about a month later, but drainage continued from the posterior portion of the wound. Radiographs showed the gradual separation of the angle. Dakin's tubes were used to irrigate the wound twice daily with 1-3,000 potassium permanganate solution. About this time the patient was annoyed by a tingling sensation of the lower lip, showing regeneration of the inferior maxillary nerve. This continued at less frequent intervals for about six weeks, when sensation reappeared, though less than normal. Seven months later the angle separated from the condyle and moved anteriorly and was removed intraorally.

November 25, 1919. The condyle had sequestered and moved downward and anteriorly so that it could be removed under ether anesthetic intraorally. All exudate disappeared and wound healed in a few days. Sensation of the lower right lip became normal. No

prosthetic appliance was supplied, since the patient had no articulation on the right side.

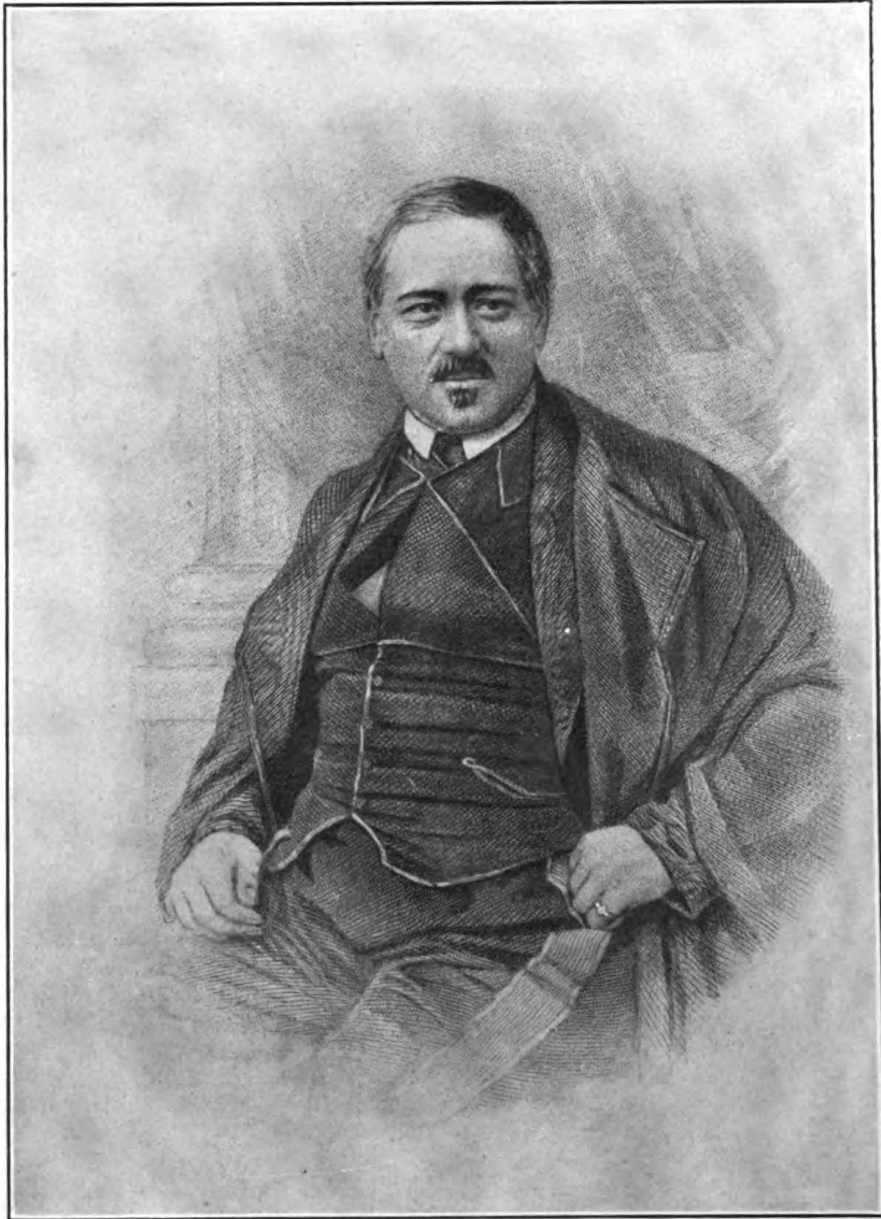
January 20, 1920. Radiographic and clinical examination showed no further complications. Patient had been on regular diet for several months and showed no loss of function or articulation except for a lateral displacement upon opening the mouth widely. The mandible swung toward the left, due to the loss of the compensating function of the external and internal pterygoid muscles of the right side.

In several early consultations with various surgeons it was decided that no external incision should be made, since it was agreed that the drainage was free, the wound could be easily irrigated, the subsequent sequestra could be easily removed intraorally, and that an external opening would probably result in a salivary fistula.

After recovery from pneumonia the patient had regular diet and gained in weight, passing from 105 pounds to 148 pounds, which had been his normal weight. The toxicity produced a slight septic fever occasionally, with dull headaches. These symptoms disappeared immediately after the removal of the condyle and did not recur.

The patient was seen about four months after dismissal from the hospital. He was then doing regular duty and was able to eat regular diet, having no symptoms other than the lateral displacement mentioned before.

17908—20—10



Alexis Soyer.

(Reproduced by courtesy of George Routledge & Sons, London.)

HISTORICAL.

ALEXIS SOYER, A CHIVALROUS CHEF.

By J. S. TAYLOR, Captain, Medical Corps, United States Navy.

"We may live without poetry, music, and art;
We may live without conscience, and live without heart;
We may live without friends; we may live without books;
But civilized man can not live without cooks.
He may live without books—what is knowledge but grieving?
He may live without hope—what is hope but deceiving?
He may live without love—what is passion but pining?
But where is the man that can live without dining?"

—Lord Lytton.

A high-powered car sweeping through silent streets, a waiting stretcher, a room of dazzling brightness apparheled for the midnight operation of emergency, form a dramatic ensemble of compelling power. But no audience sits enthralled before the spectacle of brains battling against fate to salvage the starving or redden the thin blood tainted in the tenement.

For generations boys' voices will vibrate and girls' hearts will thrill with the laureate's tale of a tactical blunder, and students will wrangle over the just apportionment of blame to Raglan, Airey, Lucan, Cardigan, and Nolan for the loss of 10 score troopers. But who knows that the leader of the Light Brigade owed his life to the strength and docility of a mere horse?¹ How many have reckoned the odds that the newspaper correspondent² might have reaped life-long opprobrium instead of applause who first dared despoil a government of its claim to confidence by telling how that government had sent soldiers clad in the summer garb of Gibraltar to freeze before Sebastopol, had failed to fitly feed its fighters so that they died by the thousand of scurvy and dysentery, while the inmates of the rat-infested hospitals of Scutari lay between canvas sheets, served with sickening messes that did not nourish and tended by palsied pensioners who knew not how to nurse?

Florence Nightingale's name will live so long as wars are waged and women do not grow too great to minister to suffering, but there is danger that one who (in an humble capacity) worked with her

¹ A thoroughbred chestnut with a white stocking on the near fore and hind legs. The charger lived 9 or 10 years after the battle.

² W. H. Russell.

to cherish and cheer the lives of the heroes of the Crimea, whose rôle, whatever the charms of his cheerful spirit, was with cabbages and casseroles, may be forgotten.

On a foggy night in February, 1855, a tall, handsome, rather portly man who, from the abundant admixture of gray with the original black of hair and moustache, would have passed for 50, though he was actually five years younger than that, left the Old Drury Lane Theater for the Wellington restaurant to keep a supper engagement. Having missed his friends, he sat down to look over the Times, England's national paper, which had instituted a campaign of publicity in regard to the horrible situation of British soldiers in the East. After reading and rereading one of the leading articles with close attention, pen and paper were required of the waiter, and the following epistle indited and forthwith consigned to the mail:

THE HOSPITAL KITCHENS AT SCUTARI.

To the Editor of the Times:

SIR: After carefully perusing the letter of your correspondent, dated Scutari, in your impression of Wednesday last, I perceive that, although the kitchen under the superintendence of Miss Nightingale affords so much relief, the system of management at the large one in the barrack hospital is far from being perfect. I propose offering my services gratuitously, and proceeding direct to Scutari at my own personal expense to regulate that important department, if the Government will honor me with their confidence, and grant me the full power of acting according to my knowledge and experience in such matters.

I have the honor to remain, sir,

Your obedient servant,

A. SOYER.

FEBRUARY 2, 1855.

Though it was nearly 1 o'clock, Mr. Soyer now engaged in a semiprofessional conversation with one of the head waiters and amused himself by writing out a number of recipes for dressing, cooking, and serving kidneys and some general hints for after-theater suppers while his own was being prepared. The very next morning, to his surprise, he read his letter in the Times, and the news soon got about town that the Great Soyer was going to the Crimea to cook.

Alexis Soyer, a native of Meaux-en-Brie, was the leading chef in the British Isles. For some 12 years he had presided with distinction over the kitchens of the Reform Club, and thus attracted the friendly notice of many of England's leading men—the Duke of Newcastle, Lord Raglan, Lord Panmure, Colonel Seymour, aid-de-camp to the prince consort, and a host of others whom he was soon to see again under very different circumstances, when they remembered him and graciously furthered his public-spirited enterprise. During the Irish famine of 1846 Soyer had also attracted the favor-

able notice of His Royal Highness the Duke of Cambridge, General W. Paulet, General Sir J. Jones, and others when he participated in the work carried on for the relief of the sufferers. In the square before the Dublin Barracks Soyer conducted an open-air kitchen, where between four and five thousand people were fed daily at a nominal cost, and facilities were available for double that number in his kitchen near the South Union Workhouse. Here a single furnace supplied heat to double boilers by means of steam pipes.

Soyer's name was widely known in England through the "relish" he had invented, and the popular Shilling Cookery Book, of which 40,000 copies were sold, while his *Modern Housewife* had considerable circulation in America, too. He had married an English woman, Emma Jones, an artist of some merit, who was buried in Kensal Green Cemetery under a splendid monument bearing the simple epitaph "To her." Before starting for the East, Soyer changed this at the suggestion of the cemetery chaplain to read: "To the memory of Madam Soyer; England gave her birth; genius immortality." Soyer was devoted to his wife and had a profound belief in her talent. He took with him to the war a picture, by her styled "The Young Bavarian," and it formed the chief decoration and treasure of his hut on Cathcart's Hill, Balaklava, commonly known as Soyer's Villa, though the inmate described it as a match box, an appropriate title, indeed, for the modest dwelling caught fire during the course of an elaborate dinner and musical festival given by the chef after the fall of Sebastopol and attended by Generals Wyndham, Rokeby, Craufurd, Paulet, Garrett, Colonels Russell, Blane, Hardinge, Fielding, Drummond, Ponsomby, and about 30 other officers, besides those who carried out the musical part of the program. Soyer's one concern at the fire was to save the painting. He had bought it in at a sale at Christie's in 1846 and prized it highly. Soyer relates that he showed it to the celebrated historical painter, Horace Vernet, who pronounced it superior in boldness of style and truthfulness of color and design to anything he had ever seen from a woman's hand.

Soyer's qualifications for the task he was about to undertake were that he was a master of the culinary art in all its branches; he knew this and others knew it. He could speak with authority. And he was more than a concocter of fancy dishes. He had been cooking for a quarter of a century and had a practical as well as a theoretical knowledge of each detail of his work. He was able to extract every bit of available nourishment from any given article and serve it so as to tempt the most fastidious palate. It occasioned Soyer real pain to see anything wasted, and he considered economy a virtue whether working for prince or pauper. At Odessa he was horrified to learn that only the tail and claws of the magnificent crawfish served in the

hotel were eaten and whole tons of the part which makes the exquisite *bisque d'écrevisses* were thrown away every month. While a guest of the Hotel Europa, Odessa, he resolved that on returning to England he would sing the praises of the sturgeon, of which the British knew only the roe, from which caviar is prepared. The commander of the First Battalion of the Coldstream Guards testified that after Soyer's methods were introduced fuel previously required to cook for one company sufficed for eight, and that 48 pounds of excellent lard, previously thrown away, were extracted from the salt pork and beef in 420 rations. He was the inventor of a teapot, which not only yielded a more refreshing beverage, but effected a considerable saving in the principal ingredient. He knew to a fraction of an ounce the quantity of materials required for the concoction of a dish for a given number of people. For all staple dishes he used cards or charts setting forth the necessary data. Like every true Frenchman, he thoroughly appreciated the enormous value of seasoning and what can be accomplished with a handful of herbs and a judicious use of salt and pepper. If, to all this, we add resourcefulness, tact, and a singular blend of modesty and confidence, an earnest desire to be really useful, a genuine love of his fellow men, and a passion for order and system, it is easy to understand Soyer's success in the Crimea and the hearty reception which always awaited him alike in the officers' mess and at a bivouac of the wild and turbulent zouaves.

A few days after the appearance of Soyer's letter in the Times he was summoned to Stafford House by the Duchess of Sutherland, who had invited a number of notables to be present and concert plans for the success of his undertaking. Everybody but Soyer himself seemed appalled at the difficulties in the way. He was confident of success, and explained that he desired in the first place to have full liberty of action and would pledge himself to the strictest economy. He proposed to utilize the Government ration as far as possible, only varying and improving on the method of using it. He did not wish to do any buying but to advise with the contractors, condemn unsuitable provisions and carry out in every way the regimen ordered by the doctors. "Upon my arrival at Scutari I propose at once to take 200 patients and diet them for a week or more, according to the doctor's approbation, and then gradually increase the number until I have the whole under my direction, if approved of by the chief medical officer." By way of practical proof of what he could do, Soyer now invited his hearers to taste a variety of dishes which he had just prepared from the existing ration and left in the care of the footman who admitted him.

The Duchess of Sutherland arranged at once for Soyer to have an interview with Lord Panmure, the secretary of war, who approved everything proposed by the chef, and would have had him start for

the Crimea the very next day, but Soyer did not intend to go until all his plans were fully matured. Later, on his way to St. James to call on the Duke of Cambridge, he met His Royal Highness on the street, and by his advice took council with Comte, the duke's major-domo, whose recent sojourn at Scutari enabled him to give Soyer many valuable points. The next step was to devise and prepare a camp or field stove to replace the cumbersome and wasteful article used by the army. His sketch of a small, compact, easily cleaned, and economical portable stove met with the approval of a prominent firm of engineers, who promised to make him a model on a scale of 1 inch to the foot. Two days later, armed with the new device, he presented himself again to the secretary of war and he, just as everybody that saw it, was at once impressed with its value.

Having procured a secretary to accompany him, Soyer set off for Paris, where he picked up a few capable cooks and assistants and carefully inspected the cooking and dietary arrangements of the Invalides, the Hôtel Dieu, and the Val-de-Grâce. After a brief delay in Marseilles where he did not fail to gratify his palate with a dish of bouillabaisse, chiefly known to English-speaking people through Thackeray's famous verses, Soyer embarked with his staff of eight on a troopship bound for the Bosphorus.

On the morning that the vessel approached Constantinople Soyer's delight in the grandeur of the scenery was suddenly replaced by a feeling of anxiety and trepidation when some one pointed out the huge hospitals of Scutari. For a moment he was overcome at the enormity of the task he had undertaken in promising to reorganize the cooking department in those institutions where so much was lacking and where he was now to enter upon his duties, a foreigner, a civilian, a complete stranger to those who administered them. The most imposing of the two establishments was known as the Barrack Hospital, an enormous building originally constructed to house troops and assigned by the Turkish Government for use as a British military hospital. It was built in the form of a vast square. The sides measured nearly a quarter of a mile. There was a tower at each corner (in one of them Florence Nightingale had her headquarters), and the central court was supposed to be big enough for 10,000 men to exercise in at one time. It had accommodations, such as they were, for more than 3,000 patients. About a mile away was the General Hospital with a capacity of 500 or 600 patients, a smaller and better conducted institution, as it had been planned from the first for the reception of patients. Suddenly Soyer recalled how confidently he had outlined to the Duchess of Sutherland his intention of starting with 100 patients and gradually enlarging his operations as circumstances permitted. His courage returned and instead of being appalled at the enterprise before him he felt only

a consuming desire to begin at once. Having reported his arrival to the British ambassador, conferred with Lady Redcliffe, and Signor Roco Vido, the embassy chef, he went to call on Gen. William Paulet and Dr. Cummings. Quarters were to be found for him in Scutari, as there was not an available foot of space in either hospital.

After these important preliminaries Soyer at last had an opportunity to make his first inspection of the famous Barrack Hospital and decided to establish his model diet kitchen on one of the large staircases. The following day, after inspecting the General Hospital, Soyer repaired again to the Barrack Hospital to pay his respects to Miss Nightingale. She received him cordially and gave him some wise advice as to whom he should see and how to proceed in initiating his campaign. Soyer informed her that he proposed to draw up charts giving the quantity and character of the ingredients for sample diets approved by the medical authorities. He expressed a desire to inspect the kitchens then in use and the storerooms, and to procure a statement of the daily rations allowed each patient.

That afternoon Soyer, Miss Nightingale, the deputy medical superintendent, and a prominent member of the purveyor's department made a tour of the establishment. The first thing that Soyer observed was the inferior quality of charcoal used. It was little more than coal dust, thus causing a great deal of smoke with consequent delay in serving meals. With one exception, each kitchen proved to be the scene of wild confusion, filled with smoke and the odor of burnt food which was without proper seasoning. As Soyer was a strong advocate of having the cook and not the patient season his food he gave an impromptu demonstration of what could be done by a skillful use of pepper and salt, to the great delight of the bystanders. When he entered the general kitchen he was astonished at its proportions and equipment. Twenty copper boilers of 50-gallon capacity each and set in white marble confronted him and 16 soldier cooks were engaged in cleaning the boilers preparatory to making tea. Soyer took notes of everything he saw, questioned the various employees about their methods, and without criticizing anything quietly remarked that he would be on hand at 7 o'clock next morning and took his departure.

Our energetic and enthusiastic Knight of the Saucepan was better than his word, for half-past 6 on the morrow found him engaged with the duty sergeant in inspecting the quantity and quality of the meat allowed and the method and place of distribution. The meat was poor, the system of distribution complicated. Some patients received three-quarters, some one-half, some one-quarter of a pound of meat according to whether they were on full, half, or quarter rations. On some days, therefore, in preparing soup for, say, 100 patients, the meat available for the purpose might vary from 10 to

20 pounds. The meat was spitted on rough pieces of wood 2 feet long and tied as tight as possible with a strong cord. In the store-rooms the so-called mixed vegetables proved to be largely of one kind and half of them were unfit for issue. The poultry was all of inferior quality, consisting mainly of old fowls badly plucked and drawn and "the gizzards, heads, and feet, which make such good broth, were thrown away." The bread was excellent. At the noon hour Soyer returned to the kitchens, where confusion and uproar reigned. The same was true in the wards when food was being served to the patients. Soyer was surprised to find the sick eating their meat first and the soup afterwards, owing to the fact that each had but a single plate, or rather a round, deep, tin dish calculated to hold a pound of meat and a pint of soup. He directed them to cut the meat as usual into small pieces and pour the boiling soup over it, a scheme which had the double merit of simplifying the service and keeping the meat warm. Till then patients had always eaten their meat cold because of the time it took to cut it up. Both the soup and the meat were tasteless. The potatoes were watery. Soyer had no hesitation in promising that all this would soon be changed. In some messes the men complained that the meat was quite raw; in others that it was overdone. This was easily explained by the way the meat was put on the skewers, since the portions bound by the cord and the rest of the joint were unequally exposed to the heat.

Soyer then requisitioned for six rations of everything allowed for making soup and proceeded to prepare and season it with his own hands. When the doctors and purveyors tasted the product they were astonished at its flavor and pronounced it vastly superior to the unsavory, blackish mess served before. Soyer promised that in future all the soup would be like the sample they had tasted and even better if he could be allowed a few pounds of brown sugar and a little flour. This was readily conceded and assurances were given that an effort would be made to get better poultry and vegetables, while the subject of charcoal was immediately taken up with the commissary department.

After this strenuous day our reformer spent a miserable night in a small Greek restaurant along with 16 fellow sufferers. They slept on sofas and tables, and such as were fortunate enough to have an overcoat with them used it for cover, the night being cold. There had been some delay in the completion of his quarters, and the restaurant in question was the only lodging place he could find on returning late from the hospital, as the war had brought a great influx of transients to Scutari and rooms were very hard to obtain. By 6 in the morning he was up, feeling unrefreshed and little disposed to work, and he was thoroughly disgusted when on entering the kitchen of the Barrack Hospital at 7 he found that none of the orders

issued on the previous day had been executed and that the members of his own staff had not yet arrived. To make matters worse he was informed that the usual time for issuing rations was 10 o'clock. A call at the purveyor's headquarters, however, brought quick results and in an hour operations were well under way. It turned out that his own cooks had fared even worse than he during the night. They had been assigned a hospital storeroom to sleep in and passed the night engaged in a fierce battle with the rats that pervaded every part of the establishment.

The day was spent in making arrangements for his special diet kitchen (for which a new charcoal stove was built and an oven, storeroom, and larder provided); in making soup with the ingredients of the regular ration after his own recipe; in systematizing the handling and distribution of food and instilling in the minds of the soldier cooks some of the cardinal principles of economy—the saving of the fat from the meat used in making soup, for example. For cooking purposes this was far superior to the wretched butter obtainable in the vicinity only at a fancy price.

In the weeks that followed Soyer continued with increasing success to initiate the soldier cooks into his methods and they soon became a competent, well-organized band. Recipes for standard issues of food were copied and hung up in the various kitchens to show the weights and measures of each ingredient required. Soyer did not believe in copper vessels, considering them dangerous except in the homes of the rich or in small institutions where there was ample time and service to insure their being kept scrupulously clean. Under the circumstances he could not do away with them at Scutari, but for making tea and coffee he had constructed large well-tinned kettles of 8-quart capacity with coffee filters inside. In these he would place the tea ration for about 20 men and pour boiling water over it. The resulting beverage was pronounced by everybody far superior to what had been served before.

Soyer visited the various other hospitals of Scutari and Pera, both military and civilian, where his advice was eagerly sought, and his many practical suggestions were promptly carried out.

As soon as the installation of his special diet kitchen in the Barrack Hospital was complete Soyer decided to have a grand formal opening and give a demonstration of his methods, but instead of beginning as he originally proposed by caring for a limited number he formed the bold resolve of undertaking to feed the half of the total number and to close all the special diet kitchens except the one under the immediate direction of Florence Nightingale and another which was supervised by one of the principal medical officers. In the history of his "Culinary Campaign," Soyer says: "This, I was aware, was a bold experiment; for had I failed—and many unforeseen events

might have caused such a result—my reputation would have suffered. I was, therefore, well aware that I was risking the labour of twenty years against an uncertainty; as all those I was about to invite would come to watch my proceedings with the eyes of Argus, and would judge of my plans accordingly. At all events, my sample trials had already given great satisfaction to two eminent doctors. In pursuance of this plan, I went to Lord William Paulet, explained it, and begged him to send, or cause to be sent, invitations to all the principal officers to honour me with their presence upon the occasion, which his lordship kindly promised to do. I also apprised the doctor in chief, who promised to attend himself and invite the principal medical gentlemen to do the same.”

The disaster which our brave *cordon bleu* recognized as a possibility came near being realized, for after the invitations had been sent out and preparations for the great occasion begun he was suddenly taken sick and for three days could not issue a single order or explain what he wanted to anyone else. Fortunately, he recovered as suddenly as he had been taken ill and the affair went off very well. At the appointed hour his kitchen was crowded to overflowing with interested military and civilian officials to the number of a hundred or more, who tasted the foods prepared, inquired into every detail, and expressed themselves well pleased with all they ate or saw. From now on Soyer's work was no longer viewed as a doubtful experiment, and to his reputation as a consummate purveyor to the palate of the epicure was added that of the practical, industrious cook able to serve 1,000 sick soldiers with food adapted to their needs and at a considerable saving in cost to the Government.

As was to be expected, Soyer's fame in the new rôle of military chef soon extended to the actual seat of war, and the numerous requests which he received to extend his labors to the men in camp coincided thoroughly with his own desire to visit the theater of active military operations and to contribute what he could to the comfort and welfare of the men who were doing the fighting. It was on the 2nd of May, exactly three months after writing his letter to the *Times*, that Soyer, in company with Florence Nightingale, embarked for the Crimea. The voyage afforded him an opportunity of becoming better acquainted with “*Mademoiselle Nightingale*,” for whom he had conceived from the first the most ardent and enthusiastic admiration. Her practical common sense, her energy, her intelligence, her unwavering devotion, and her supreme disregard of personal inconvenience or danger of any kind made Soyer her devoted champion for the rest of his life. Through his qualities of heart and mind he was fully capable of appreciating the genius and charm of this noble woman, and his reminiscences of the war set forth in artless fashion the delight that he always felt in ministering

to her welfare, advertising her many virtues, and furthering her plans in every way.

When Florence Nightingale, after the close of the war and her return to England, began, in cooperation with Sidney Herbert, to institute many measures for the betterment of living conditions in the barracks at home, she called on Soyer for assistance, which he rendered in a most cheerful and whole-hearted way until his sudden death. In a letter written to Capt. Galton soon after this sad event, Miss Nightingale said: "His death is a great disaster. Others have studied cookery for the purpose of gormandizing, some for show, but none but he for the purpose of cooking large quantities of food in the most nutritious manner for great numbers of men. He has no successor. My only comfort is that you were imbued before his death with his doctrines and that the barracks commission will now take up the matter for itself."

Soyer has left us a description of Miss Nightingale which is interesting as a portrait of the "Angel of the Crimea," and also as showing how little the innate Gallic bias of the author had been modified by years of residence in England. No one but a Frenchman would have ever compared Florence Nightingale to the queen of the tragic stage. "She is rather high in stature, fair in complexion, and slim in person; her hair is brown, and is worn quite plain; her physiognomy is most pleasing; her eyes, of a bluish tint, speak volumes, and are always sparkling with intelligence; her mouth is small and well formed, while her lips act in unison, and make known the impression of her heart—one seems the reflex of the other. Her visage, as regards expression, is very remarkable, and one can almost anticipate by her countenance what she is about to say. Alternately, with matters of the most grave import, a gentle smile passes radiantly over her countenance, thus proving her evenness of temper; at other times, when wit or a pleasantry prevails, the heroine is lost in the happy, good-natured smile which pervades her face, and you recognize only the charming woman. Her dress is generally of a grayish or black tint; she wears a simple white cap, and often a rough apron. In a word, her whole appearance is religiously simple and unsophisticated. In conversation no member of the fair sex can be more amiable and gentle than Miss Nightingale. Removed from her arduous and cavalier-like duties, which require the nerve of a Hercules—and she possesses it when required—she is Rachel on the stage in both tragedy and comedy."

The account of his experiences at the front is highly entertaining and throws many sidelights on the conditions prevailing there. The incidental allusions to the wretched roads or lack of them between the various camps and outposts; to the lack of storehouses; to the ravages of scurvy, fever, and dysentery; to the lack of coordination

between the various administrative branches of the army; to the confusion and disorder which prevailed; to the discomforts and hardships endured by the private soldier; to the relative merit of dispositions made for the sick by the English, French, and Italian contingents; to the disregard of danger; to the pilfering, thievery, and lawlessness of some of the African troops; to the carousals of the officers (in which he took his part), paint a vivid picture of the campaign and have particular significance just because they are only incidental allusions.

It was not all plain sailing for Soyer, but patience, good nature, and diplomacy carried him through. He had the tact and good sense not to dilate in his book on the trials and disappointments he endured, for it was published after the war was over and when the Government was being investigated for the costly mistakes due to official incapacity. Like all reformers, he had not only to surmount many obstacles, but to combat the prejudices of that class of men who believe that as things have been so they should always be. One day Soyer attended a meeting of general officers, convened by order of the minister at war, to consider the advisability of supplying hot soup to the men in the trenches throughout the winter. At this meeting he had a lively exchange of views with a certain Gen. Eyre, who professed himself quite willing to contribute to the welfare of the soldier, but declared that efforts in this direction were bound to interfere with discipline and convert good soldiers into bad ones.

Soyer's first concern at Balaklava was to improve his department of the various hospitals and in this he received prompt assistance wherever he turned, from Lord Raglan, the commander in chief, down to the humblest private. His modesty and simplicity, his directness of purpose, his perfect knowledge of his art appealed to everyone. The account of his interview with Capt. King, of the Engineers, is significant.

"'You are aware,' said the latter, 'that we are not in London; and I can not build a kitchen in the Crimea such as you had at the Reform Club.'

"'I should be very sorry if you could, as in that case you would have to get somebody to manage it, for I assure you I should not like to begin my gastronomic career again; and I must say I feel every bit as proud in having to cook for the soldiers, if not more so, than ever I did in cooking for the greatest epicures or the first lords of England.'

"'Then,' said Capt. King, 'we shall work well together.'

"'I have no doubt of it, Captain, as I only require a few workmen, such as carpenters and bricklayers; some planks, nails, and a few bricks and a little mortar. If my new field stoves were finished

I should not trouble you at all, as they will cook in the open air and do not require any fixing.'

"If you do not need anything more elaborate than your kitchen here, we shall be able to give you satisfaction. Have you seen the plan I have drawn out for you?'

"Yes, I have; it will do very well.'"

But in spite of the interest and good will which he aroused on every hand actual accomplishment was very slow owing to the complicated system and often to the lack of system that prevailed.

Soyer was anxious to duplicate in the hospital at Sebastopol the open-air kitchen he had installed at the Sanatorium Hospital, the importance of which from a military point of view he fully appreciated. The Sebastopol Hospital was located almost under the walls of the city and liable to be called on at any moment to care for a large number of wounded in case of a divided attack or a sudden sortie. He wanted to be in a position to supply nutritious articles of food, more particularly beverages, after surgical operations in any emergency and on a large scale. His recommendations were acknowledged and their value recognized in a communication from the commander in chief's military secretary on May 30, but it was not until July 5 that he was informed that any real progress had been accomplished. Meanwhile Soyer had made a hurried visit to Scutari to see how things there had been going during his absence, as the man left in charge had several times threatened to run away and finally came down with a severe illness.

He was not idle during the long delays which hindered his various projects. One day finds him busily superintending the soldier cooks at the Sanatorium Hospital; on another he is closeted with Sir John Macneil urging the merits of a bread biscuit made of three parts flour and one part pea meal which would keep for months and was equally palatable whether eaten dry or soaked in tea or soup. Again we find him starting out to interview the head of the commissariat department. "The ride from the top of the Genoese heights of Balaklava Harbour, by a new road, through mud, over rocks, rivulets, etc., and mounted upon a strange nag, was anything but pleasant to my feelings as a horseman. At all events, after numerous slippery evolutions on the part of my new charger, I found myself safe at the bottom of the ravine; but here another difficulty presented itself. The quay of the harbour was encumbered with French and Sardinian waggons, mules, and horses. The French, who had a wine depôt there for the troops, were strongly fortified with about a hundred pipes of wine, instead of gabions. So crowded was the road from the immense traffic and the unloading of shipping stores, that it took me nearly half an hour to ride a few hundred yards."

Having found the official he was looking for, 10 minutes' conversation sufficed to describe what he had seen in his visit to various stores of provisions and to discuss the matter of the dry vegetables issued to troops. Soyer wanted to substitute for the vegetable cakes then in use, which, though expensive, had lost their aroma and nutritious qualities, a cheaper and somewhat coarser combination of his own devising. Each cake, packed in compartments of 10 rations and plainly marked, would serve for 100 men. It was to contain in pulverized and compressed form a variety of vegetables—carrots, turnips, parsnips, onions, cabbage, celery, and leeks, with ample seasoning—as represented in the ordinary French vegetable soup. The scheme met with approval by the authorities and was submitted to the war office.

While Soyer was constantly giving advice, he was just as keen to receive it, asking everybody's opinion and consulting with the personal chefs of the high functionaries of the army and looking for useful suggestions in the French and Italian camps and hospitals. Though the messing arrangements in camp and the hospital dietary of the French Army was generally conceded to be superior to the English dispositions, it afforded him legitimate pride and joy to discover, on inspecting some of the French regimental kitchens, that they were not so economic in cooks and fuel or so well conducted as those which he established.

About this time Miss Nightingale was taken with a severe attack of fever and was obliged to return to Scutari to convalesce. Soyer accompanied her on the yacht put at her disposal by Lord Ward, as the stoves made in England according to his design had arrived but had been landed by mistake at Scutari, 300 miles away; and, as usual in such cases, the only way to secure their delivery at the proper destination was to go and attend to the matter in person. Miss Nightingale, who even in sickness could not dismiss from her mind the sufferings of others, which she always put before her own, charged Soyer with a variety of commissions, which he gladly undertook.

"Having apprised Lord W. Paulett of our arrival, I went my way and Mr. Bracebridge his. At 5 o'clock we again met at the landing place and went for Miss Nightingale. One of the large barges used to remove the sick, manned by 12 Turks, was brought alongside. As the roof nearly reached the steamer's bulwarks, Miss Nightingale was easily lowered upon it. Mrs. Roberts was kneeling at her side and holding a white umbrella over her head. We went below; the sailors gave three cheers; and our dismal gondola soon reached the shore. Upon landing, the invalid was carried upon a stretcher by four soldiers, accompanied by Lord W. Paulet and staff, Dr. Cumming (who had visited her on board), followed by an immense procession, to her

private house—at which place all dispersed. I do not recollect any circumstance during the campaign so gratifying to the feelings as that simple, though grand, procession. Every soldier seemed anxious to show his regard and acknowledged his debt of gratitude to one who had so nobly devoted her soul and comfort to their welfare, even at the risk of her own life.”

During the stay in Scutari, Soyer was able to institute some needed reforms at the Palace Hospital, the sick officers quartered there having complained to him about the food, etc., and requested his kind offices on their behalf. He succeeded in locating the consignment of stoves made according to his new model, and the public trial of them, conducted before the military and medical authorities, having succeeded and even surpassed his expectations, he was, of course, full of eagerness to go back to camp and superintend their adoption there; but a vexatious delay was caused by the irregularities of the head cook, one Jullien, whom he had left in charge at the Barrack Hospital. Soyer had known and trusted him for years, esteeming him an honest, industrious, and well-educated man, and he merited the high regard of everyone connected with the institution until he suddenly disappeared, taking with him £100 which Soyer had intrusted to his custody for a day. The money was returned later, but there was nothing for Soyer to do now but roll up his sleeves and go to work in the kitchen until a suitable substitute for Mr. Jullien could be found.

“I was, owing to the sudden departure of my head man, Jullien, busily engaged at my forges, surrounded by my soldiers, like a modern Vulcan, dressed in my culinary attire, and in the act of manipulating some hundreds of mock rice puddings (made without eggs or milk) for my numerous convalescent guests, the brave British, when suddenly my kitchen was filled with military gentlemen of all ranks, amongst whom was no less a personage than the late minister at war, the Duke of Newcastle, Lord W. Paulett, and numerous other high officials—military, medical, and civil. His grace, setting all etiquette aside, advanced towards me, his hat in one hand, and kindly offered me the other, saying, ‘How are you, Monsieur Soyer? It is a long time since we had the pleasure of meeting.’

“‘True,’ I replied; ‘not since I had the pleasure of seeing your grace, then Lord Lincoln, at the Reform Club.’

“‘You are right, Monsieur Soyer; you have an excellent memory.’

“Though my present occupation was one of the humblest in the category of my art, viz, making puddings for the soldiers, still the kind condescension of his grace, and the complimentary remarks he made upon my services, caused me to feel more proud of my humble occupation than I did when I was dressing the great Ibrahim Pacha

fête at the Reform Club, in the year 1846, or preparing my hundred-guinea dish at the York banquet, in the year 1850.

"The Duke of Newcastle was not the first nobleman of his high rank who had honoured me with that degree of favour; but the others had a certain interest in so doing. For instance, while at the Reform Club, a number of epicures used to pay me visits, shake me heartily by the hand, and most cordially inquire about my health. These had, I always considered, a twofold object in view; first, to induce me to give them the best of dinners; secondly, to ascertain whether I was feverish or in good health. * * *

"In the present case, His Grace had no such object in view, as I had nothing to offer him but soldiers' hospital rations, diets, etc., composed of beef tea, mutton broth, rice puddings, etc., and my new biscuit bread, which had been made three months, having the date of baking stamped upon it. I drew the duke's attention to this, and then broke a little into some mutton broth; and in five minutes it had all the appearance of a piece of fresh bread soaked in broth. In its dry state it was much more agreeable to eat than the usual biscuit. His grace was highly pleased with it, and advised me to recommend its adoption to the war office upon my return to London.

"The kitchen was by this time full of officers and medical men, come to pay their respects to the duke, forming a numerous escort as he went round the hospital. I gave a short account of my proceedings since my arrival at Scutari, where I had closed all the kitchens but this one, minutely explaining all its details, as well as the plan I had adopted to keep it so clean and so cool, at which the duke was much struck. Cooking was done daily in it for more than 1,000 men, the weather being then intensely hot. After honoring me with most flattering compliments the duke and party retired. Lord William kindly informed me that the duke would visit the other hospitals in a day or two, and that he would give me due notice of his visit. Accordingly, two days afterward, he showed the duke over the General, Hyder Pasha, and the Palace Hospitals, with the arrangements of which he expressed himself satisfied.

"A few days after, the Duke of Newcastle left for the Crimea, but prior to his departure honored me with the following letter:

MESSERIE'S HOTEL, 23rd July, 1855.

DEAR M. SOYER: Accept my best thanks for the copy of your book.

Your philanthropic labors in this country deserve the thanks of every Englishman, and for one I am grateful for what I have seen of your good work at Scutari.

I am, yours, very truly,

NEWCASTLE.

"At length I found two tolerably good cooks and reestablished everything in the culinary department to my satisfaction. My pres-

ence being no longer required, I prepared for my departure. I had taught about a dozen soldiers my system of camp cooking and the use of my new field stoves. I also engaged a French zouave, named Bornet, belonging to the Third Regiment, whose term of service was just out. He was to act as my aid-de-camp, ecuyer, master of the horse, and shield in case of blows. He knew the savate, singlestick, sword, foil, and could box well; was a capital shot, and extraordinarily good horseman; he could sing hundreds of songs, and very well, too; had a good voice, danced excellently, and was altogether of a very happy disposition.

"Among his other, then unknown, qualities, he was very quarrelsome; a great marauder à la zouave; remarkably fond of the fair sex, in his martial way, running all over the camp after the heroic cantinières; and, though never drunk, seldom sober, always ready to fight anyone whom he thought wished to injure or speak ill of me. In fact, he was, much against my will, my bulldog and kept barking from morning till night. He was allowed to wear his costume for 12 months longer. In fact, my zouave was a model of perfection and imperfection. The doctor of his regiment, who admired him for his bravery and cheerful abilities, impressed upon me that he was the man I required. 'Very scarce they are,' said he; 'there are not more than 100 left out of the whole regiment who began the campaign; and he is sound, although wounded at Inkermann.'

"Upon this strong recommendation and having to run so much risk about the camp, as well as for the curiosity of the thing, I engaged Bornet, the zouave, had a new costume made for him, introduced him to Lord W. Paulet, Miss Nightingale, etc. Everybody found him extremely polite, good looking, and intelligent. We bought four horses, and he had the sole command of the cavalry department. All admired his extraordinarily good style of horsemanship, particularly Lord W. Paulet. Thus the illustrious Francois Patifal Bornet, late of the Third Zouaves, was recognized as belonging to the British Army. He and 12 soldiers composed the brigade of Captain Cook, a title I had assumed in the camp.

"We were now ready to enter upon our campaign. I had paid my respects to Lord and Lady de Redcliffe at Therapia and to General Vivian at Buyukderé; he was then at the Palais de Russie. In this town I and my zouave created quite a sensation. I had adopted an indescribable costume. It seemed to have attracted John Bull's particular attention on his supposed visit to the camp. Such, at least, was the case according to the Times correspondent, who, in a dialogue with John Bull, says: 'I beg your pardon, but who is that foreign officer in white bournous and attended by a brilliant staff of generals—him with the blue and silver stripes down his trousers, I mean, and

gold braid on his waistcoat and a red and white cap? It must be Pelissier?’

“That! Why, that’s Monsieur Soyer, chef de nos batteries de cuisine; and if you go and ask him, you’ll find he’ll talk to you for several hours about the way your meat is wasted. And so I wish you good morning, sir.’”

Soyer also took back with him to the Crimea a young Italian cook whom he had picked up and attached to his retinue mainly because he was very musical and had a good voice. Soyer appears to have been partial to surrounding himself with dependents.¹ He often was moved more by generosity and tenderness of heart than love of display. Thus when he returned to England he took with him a little Russian orphan boy, a stowaway on the ship, to whom he became much attached. On the present occasion his strangely assorted retainers kept him busy settling their quarrels. The zouave was always threatening to throw the Armenian groom overboard and to smash Antonio’s head, while an Albanian cook repeatedly evinced a desire to cut Victor into pieces and throw them in a pickle tub. Their master was constantly making them shake hands all around and promise to live together like Christians and stand by to sing for him when ordered. Far from being seriously annoyed by their misbehavior, Soyer took it all good-naturedly and even derived entertainment from the disorderly conduct of the zouave, who resisted to the last every humanizing influence and stole, gambled, got drunk, and disobeyed orders to the end of the chapter. This wild, untamed creature had the one merit of being a superb horseman, and Soyer felt a boyish pride in the equestrian feats which on one occasion drew a compliment from General La Marmora. “The general appeared much surprised to see a zouave on horseback in my suite not wearing the exact costume of that corps, as I had made some stylish improvement in it, in order to distinguish him from the common soldiers.”

As our hero’s first care on getting back to camp was to put his new field stoves into operation he called on Gen. Simpson, the commander in chief who succeeded Lord Raglan, and outlined his project of trying them out on a small scale with a view to their ultimate introduction throughout the army at large.

The interview is thus described:

“‘You have only, Monsieur Soyer, to tell me what you require.’

“‘First of all, General, that you should select a spot where the trial can take place, and name a regiment with which I can begin.’

“‘You will require a building for your kitchen.’

¹ His interpreter in Scutari was the husband of no less a person than the original “Maid of Athens,” who must have been a mere child when Byron came under the spell of her charms.

“‘Not at all, General—no masons, carpenters, no engineers. My stoves are adapted for the open air, to cook in all weathers, and to follow the army.’

“‘I am aware of that, as I saw the model when you were here last.’

“‘Exactly. All I shall require will be three bell-tents for myself and assistants, as I must reside in the camp.’

“‘Very well; I will give orders to that effect. I would also recommend you to select a regiment near headquarters for your convenience in visiting and watching the progress of the kitchens. I think the Guards in the First Division will suit our purpose best. Do you know where they are?’

“‘I do; but perhaps you will be kind enough to send some official with me to select the spot.’

“‘We will ride over this afternoon. You had better dine with us this evening. You know the greater part of the gentlemen of my staff; and those you do not, know you.’

“‘Many thanks, General, for your kind invitation, which I accept with the greatest pleasure.’

“‘Have you anything in that parcel to show me?’

“‘Yes; one of my new bread biscuits, which I wish you to taste.’

“On opening the parcel he took it out saying, ‘Lord bless you! This will be too hard for my teeth.’

“‘Not so hard as you think. It is much softer than the ordinary biscuit which it is intended to replace. At any rate, it may be issued in turn, and will afford an excellent change for the troops. I have kept some above three months, and they are quite good. The Duke of Newcastle tasted one of them, and was much pleased with it.’

“Having broken a piece off and tasted it, the General partook of some and found it very good, though not nearly so hard as he anticipated. He declared that it was much more palatable than the common biscuit, and that he quite enjoyed it. Gen. Simpson was at that time very unwell, and he seldom ate anything but arrowroot and biscuit soaked in boiling water. I tasted some of his fare, and found it *tolérably* good, but not nutritive enough for a man who worked hard. He informed me that he was often occupied 8 or 10 hours a day writing. As his complaint was diarrhea, I proposed boiling some plain rice after the receipt given in “Addenda,” which was at all times so much approved of by the doctors. This I did the next day. The General took a great deal of bodily exercise in the camp and in the trenches. * * *

“Having fixed upon a spot for my kitchen, I immediately sent the stoves to the camp. As they happened to be close to the railway they arrived early the next morning. In the course of the day I reached

my field of battle, and to my great surprise found—what? Why, all my battery firing for the support of the Highland Brigade. The stoves had arrived early enough for the men to use them in cooking their dinners. Though I had given special orders that no one should meddle with them until I arrived, it gave me great pleasure to find that the men were using them to the best advantage and without instruction. In the first place, they could not possibly burn more than 20 pounds of wood in cooking for a hundred men, instead of several hundredweight, which was the daily consumption. Although I had not given them my receipts, they found they could cook their rations with more ease, and hoped they should soon have them for every-day use, instead of the small tin camp kettles and their open-air system of cooking. The process was very unsatisfactory, being dependent upon good, bad, or indifferent weather, and the fuel was often wet and difficult to ignite. Colonel Seymour, whom I invited to see the men using the stoves without tuition from me or anybody else, can testify to the accuracy of this fact, having witnessed the process and interrogated them upon the subject.

“My reason, reader, for relating this circumstance, is because it afforded me an assurance that I could render service to the army, and that my exertions were of some use. I saw even further than that; for I inferred that if a soldier, who is not a cooking animal, being paid for other purposes—and that talent a peculiar gift conferred in a greater or less degree upon humanity—could without trouble or instruction cook well in the open air and in all weathers, the stoves would certainly be useful in all establishments, from a cottage to a college. I do not say anything of their use in hospitals, because they had been tried in those establishments with full success, as far as military cooking was concerned. The idea of connecting baking, roasting, boiling, and steaming crossed my mind; and this, I felt with confidence, would render them beneficial and useful to the public at large. This idea I at once communicated to the makers, and they have already acted upon my suggestion. I resolved upon my return to England to bring them out at as cheap a rate as possible for the use of small or large families.

“As the Highlanders had already used the stoves, I changed my plan, and instead of placing them between the Guards’ camp, thought it would be better to have them in the center of the Highland Brigade, as near as possible to Sir Colin Campbell’s headquarters, which would enable him to watch the proceedings without trouble. For this purpose I went to his quarters and was told that the best time to see him was from 8 till 9 in the morning, at the latest. Next morning I was on my way to the Scotch camp by 7 o’clock. I saw Col. Stirling, Sir Colin’s private secretary, who informed me that Sir

Colin would be happy to receive me. My reception by that brave and illustrious general was highly gratifying to my feelings.

"I remained at the camp till nearly 3 in the afternoon. About 1 a long train of mules made their appearance, bearing wounded French and Russian soldiers—the latter prisoners. About 20 were wounded; the rest followed the mournful procession. Assisted by a few of my men, I gave them some wine, brandy, porter, etc.—in fact, whatever we could get at the canteen—which seemed to afford them much relief. I of course treated the wounded Russians in the same manner as the French, though two refused to take anything, fearing poison.

"Not doubting that many more would pass, as I had some provisions in a tent for the opening of my kitchens, I made some sago jelly with wine, calf's-foot jelly, etc., which unfortunately was not used, as the other prisoners went by a different road, though taken to the General Hospital at the French headquarters. Upon leaving I ordered my men to be on the lookout, and if any wounded or prisoners came by, to offer them some refreshment.

"Just as I was going, I perceived a few mules approaching the Guards' camp. As they advanced, I and one of my men went toward some of the wounded with a basin of sago in hand, saying, this was a sort of halfway ambulance, where they might obtain all they might require. I was aware that some of the Russian prisoners in the first convoy would not accept any refreshment for fear of being poisoned, of course not knowing better. The case of two poor French soldiers I can not pass in silence. One had been severely wounded in the head, and was almost in a state of insensibility; the other had had his leg amputated on the field of battle. The first, after taking a few spoonfuls of the hot sago, asked for a drop of brandy, saying he felt faint. The conductor at first objected to this, but upon my asking him to take a glass with me and the patient, he agreed that it would do him no harm if it did him no good, adding, that very likely he would not survive the day. Having mixed it with water, he drank it, and thanked me warmly. The other was an officer. After giving him some wine jelly I conversed with him.

"'How good this jelly is,' said he in French; 'pray give me another spoonful or two if you have it to spare.'"

On February 8, 1855, the capture of the Malakhoff by the French and the attack on the Redan by the English lead to the evacuation of Sebastopol and this eventually to the conclusion of the war. The English had not succeeded in capturing the portion of the defences assigned them in the plan of attack, but the combined movement secured a victory. The French commander in chief, Gen. Pelissier, in reporting to the minister of war the day's glorious achievements,

said: "The English army has conducted itself with its usual intrepidity. It was preparing a second attack which would doubtless have triumphed over the unexpected obstacles encountered by the first; but the possession of the Malakhoff, which was assured, rendered this second attack unnecessary. * * * As at all times, M. le Maréchal, our wounded and even those of the enemy have been tended with the greatest care and skill; and we are indebted to the admirable organization of our medical staff and to the devotion and fidelity of those who perform its duties for the preservation of a great number of their unfortunate fellows."

Soyer exerted himself nobly to render every possible service in the hospitals at this critical time. The scenes he was compelled to witness produced a deep impression on his sensitive heart.

"On returning to the camp I prepared a quantity of lemonade, arrowroot, beef tea, arrowroot water, barley water, rice water and pudding, boiled rice, etc., and, through the kindness of Colonel Daniell and Major Fielden, 12 men were sent to carry them to the hospitals. I spent the remainder of the day in the hospitals, which were situated about a mile from the Guards' camp, where I witnessed the most painful scenes and numerous amputations. Among those operated upon were several Russians. I could not help remarking what a blessing to the sufferer chloroform proved. Wonderful was the kindness and celerity with which the doctors performed the operations. These were so numerous that before night several buckets were filled with the limbs, and the greater part of those operated upon were doing well. The hospitals, although they contained nearly 40 wards, were full. Some of our wounded, as well as the Russians, were placed under marquees and other tents. The wounds received by some of the Russians were fearful, and the groans of those who were mortally wounded awful. Having done all that was required at the hospital I returned to the camp, where an invitation awaited me to dine at the Carlton Club. This I was much pleased to accept. The painful scenes I had witnessed weighed heavily upon the heart and mind, and a little relaxation became necessary. At about 8 o'clock I repaired to the appointed place, and eight or nine guests sat down.

"The dinner was very good; and though the bill of fare was rather extensive, every dish was cleared. Was this due to the skill of the chef de cuisine or to the 16 hours of hard work in the trenches? If the latter was really the cause of this, I should recommend a blasé epicure who has lost his appetite to try this simple and effective process. It will not fail to succeed; that is, should he escape with life after 16 hours of shooting or being shot at, like pigeons at the Red House. The conversation became very animated, and so interesting that a small pamphlet might be written upon it. All had seen some-

thing and had something to relate. My description of the hospitals was the great feature of the evening, as none present had seen them, having other occupation at their posts with the various regiments. The Queen's health, that of the Emperor of the French, and of the Sultan were toasted with three times three and one more cheer."

The cessation of hostilities was, of course, followed by radical changes in the life and feelings of the Army. Feasting and revelry was now the order of the day and banquet succeeded banquet. Soyer's narrative recalls the pictures drawn by Lever of the Peninsular Campaign and of barrack life in Ireland in the first decade of the century. Soyer, the obliging, the indefatigable, was ever ready to further any undertaking that made for happiness and good cheer, and would preside in the kitchen or seat himself at the table with the guests, according to the wishes of his friends, who usually were glad to have him do both. The convivial round was soon interrupted, however, so far as Soyer was concerned, by a sharp attack of fever, which lasted seven or eight days and was followed by a severe relapse after he had been up and about visiting with his usual eagerness his various kitchens and supervising the work of the soldiers he had instructed. He was now sicker than ever, and the physician in attendance insisted on his going to Scutari for rest and change. Soyer would at this time have returned to England but for receiving the intelligence that some 400 camp stoves, made according to his design, were on the way out from England, and he was not the man to consider his health when such an opportunity for service presented itself. The last British troops did not leave the Crimea for many months, and, the fighting being over, the long stay in camp furnished a splendid chance to get the stoves into favor and secure their permanent adoption.

At Scutari everyone showed astonishment at the change in Soyer's appearance. Many assured him that he would not recover, and his representatives in the Barrack Hospital kitchen declared that they understood he was dead. This rumor Soyer emphatically denied, anticipating Mark Twain's witticism. But his spirits were affected by all these comments, and the view from his quarters, overlooking the vast native cemetery, which had once interested him immensely, now plunged him into the deepest gloom. The lugubrious predictions and his own depression did not, however, weaken in the slightest his purpose of returning to the Crimea, though the British ambassador wrote expressly forbidding such a move. Prior to his departure he was relieved of all future responsibilities for culinary operations in the hospitals of Scutari, as his methods were now perfectly understood and in full operation there. This enabled him to take with him his own cooks, whose services he relied on for helping

to popularize the new stoves. The middle of March thus found Soyer at work again.

"The plan I had adopted for the introduction of my stoves was as follows: I first had an interview with the colonel of the regiment, who introduced me to the quartermaster, the latter to the storekeeper. Then I went to the commissariat in each division, where I looked over the stores, in order to regulate the distribution of the provisions and condiments with judgment and according to common sense.

(When I say "according to common sense" I am speaking within bounds. Salt and pepper, fresh and preserved vegetables, the latter either in tins or in cakes, were distributed from the regimental quartermaster's stores to the cooks of each company for three days' consumption at a time. The consequence was that in a couple of days, and sometimes in one, the three days' rations had either been consumed or were wasted. The first day the soup or other food was badly prepared on account of the excess of these ingredients, and it was still worse on the following days on account of their being short of all with the exception of the meat, which was therefore boiled in plain water with rice, but often without either salt or vegetables. The food was thus rendered insipid and unwholesome. Such was the system I found in general use, and it was a great pity, seeing the Government had so liberally provided all that was required. Proper regulation was all that was needed in order to increase the comforts of the men. The meals of the whole army constitute a very important matter. Any improvement was certain to be felt daily, for can anything be more unpalatable than a piece of fresh beef boiled in plain water without seasoning? There was no salt to eat with it, although plenty was allowed for each man. This is what I call want of attention and lack of common sense. I do not mean to say this was always the case, as some quartermasters who noticed the evil distributed the vegetables daily, instead of for three days at once. Many of the men were intelligent enough to divide the allowance, but the greater number were very careless. It therefore became of the utmost importance to establish a rule which would not leave them to the chance of doing wrong.)

"To remedy this evil in a private family would only require a few minutes' conversation with the cook, while in an army it would take years, as military rules would have to be changed and fresh ones introduced. Simple as the change may appear, it is still very difficult to carry out, particularly in a camp extending over such a large space of ground. Fortunately, I was invested with the power of doing so without troubling the authorities. Nevertheless it was only by the following plan that I succeeded. To effect this very important object, as well as to introduce my new system, I devoted an hour to attend in person and give the first lesson myself to the soldier cooks. As the colonel, quartermaster, and a sergeant were present, besides many officers as lookers on, a great impression was thus created upon the men, who immediately saw the importance of following my instructions. I supplied the cooks with

recipes printed at headquarters, which gave them quite an official appearance.

"After having started them in person, I sent my cooks every morning on their rounds to see if the men followed my instructions, and I visited each regiment daily. The hospitals, thank God, were at this time almost empty. When a division had made use of the stoves about a week I requested the general commanding that division to inquire of the colonel, officers, and men their opinion of the results of my labors; and in that manner I acquired the above-mentioned numerous letters of commendation, having in my possession many others, but space will not allow their insertion.

"One of the days on which salt rations were issued I requested Gen. Garrett to go round his division and ask the men what they did with the fat. This he very kindly did, accompanied by his aide-de-camp, Maj. Dallas. The first cook we visited, in the Eighteenth Regiment, had rations for 94 men (the whole of his company). They were being cooked in one stove; the two stoves for the same quantity would have been much better, as the more water the meat is boiled in the more salt is extracted from it. The boiler was filled to the brim, the contents simmering gently; the meat was beautifully cooked. There were about 4 inches of clear fat, as sweet as butter, floating on the top. The stove was in the open air and the cook only burned from 10 to 15 pounds of wood (or hardly so much) to cook for that number, viz, the whole of his company. The allowance of wood had been reduced from $4\frac{1}{2}$ pounds to $3\frac{1}{2}$ pounds per man daily. The advent of peace gave me a full opportunity of thoroughly instructing the men, and thus I was enabled firmly to establish my new system. The saving in wood alone, supposing each company to consist of 100 men, would at the former rate of allowance amount to 450 pounds per company per diem, allowing 25 pounds for cooking, which is ample. This in a regiment of eight companies would make a daily saving of 3,600 pounds of wood, independent of the economy of transport, mules, labor, etc. In an army of 40,000 men it would amount to the immense figure of 180,000 pounds, or 90 tons, per day saved to the Government, or 32,850 tons per annum.

"Gen. Garrett asked the man what he was going to do with the fat.

"'Throw it away, General,' was the answer.

"'Throw it away; why?' said the general.

"'I don't know, sir, but we always do.'

"'Why not use it?'

"'The men don't like it, sir.'

"I observed that when the salt meat was cooked in the small canteen pans, the fat was lost for want of the necessary quantity of water to allow it to rise to the surface, as well as to purify it

of the salt. Asking the man for a leaden spoon and a tin can, I removed the fat as I had before done in the Guards' camp. On weighing it the next day I found upward of 14 pounds of beautiful, clean, and sweet dripping, fit for use as described in the receipts. Thus about 800 pounds of this were wasted weekly by each regiment—salt rations being issued four days a week."

There were banquets to departing allied generals and to various British officers of high rank. A very formal and pretentious affair was the luncheon given to Gen. Lüders of the Russian Army following a grand review of the allied troops. Soyer determined to outdo all his previous efforts by the preparation of a single monster dish of his own invention.

"My novel dish was completed, and carried to headquarters by two soldiers; and at a quarter to 2 I personally placed my culinary wonder upon the table. It was called—

SOYER'S CULINARY EMBLEM OF PEACE—THE MACÉDOINE LÜDERSIENNE À
L'ALEXANDRE II.

This monster dish was composed of—

- 12 boxes of preserved lobsters.
- 2 cases of preserved lampreys.
- 2 cases of preserved sardines.
- 2 bottles of preserved anchovies.
- 1 case of preserved caviar.
- 1 case of preserved sturgeon.
- 1 case of preserved tunny.
- 2 cases of preserved oysters.
- 1 pound of fresh prawns.
- 4 pounds turbot clouté.
- 12 Russian pickled cucumbers.
- 4 bottles pickled olives.
- 1 bottle mixed pickles.
- 1 bottle Indian pickles.
- 1 bottle pickled French beans.
- 2 bottles pickled mushrooms.
- ½ bottle pickled mangoes.
- 2 bottles of pickled French truffles.
- 2 cases of preserved peas.
- 2 cases preserved mixed vegetables.
- 4 dozen cabbage lettuces.
- 100 eggs.
- 2 bottles of preserved cockscombs.

"The sauce was composed of six bottles of salad oil, one of Tarragon vinegar, half a bottle of Chili vinegar, two boxes of preserved cream (whipped), 4 ounces of sugar, six eschalots, salt, cayenne pepper, mustard, and a quarter of an ounce of oriental herbs, which are quite unknown in England."

It was received with applause and eaten with heartiness and relish, but Gen. Pelissier reproached its inventor for having failed to

stone the olives and when Sir W. Codrington, the commander in chief, had tactfully assured Soyer that it was a great success, etc., Pelissier renewed his smiling reproaches. Soyer had already explained that he had had very little time for preparation and was absent on a little pleasure trip when he got word of the proposed celebration. He now declared that the taking of the Malakhoff was only a matter of minutes, but it took four hours of hard work to prepare the macedoine!

News of the conclusion of peace reached Balaklava on April 2 and the return movement of troops began. Owing to the circumstances that always attend breaking camp, but more particularly to the pilfering by hangers-on of the army and the predatory habits of the Tartars of the vicinity, Soyer felt it his duty to remain until the very last and see that the 400 stoves and other culinary equipment belonging to the Government were properly accounted for, packed up, and shipped. It was not until July that he sailed for England. One of his last acts before embarking was to purchase the wicker carriage which had been constructed for Florence Nightingale's use in her ceaseless errands of mercy throughout the wide-spread area occupied by the besiegers of Sebastopol. The carriage was about to be disposed of by auction along with other discarded articles of every kind. Soyer took the vehicle to England, where it is still preserved as a curio. In Paris he was honored by being presented to Napoleon III and having an opportunity to tell of his labors in the East.

In the last chapter of the Culinary Campaign, Soyer tells with pride of the cordial greeting extended to him by Lord Paulet and Sir Colin Campbell, whom he met on June 26, 1857, returning from Hyde Park, where the Queen had just bestowed the Victoria cross, the emblem of a new order of merit created by her, on 62 officers and men of the British forces.¹ Sir Colin delighted him by describing the historical painting of Scutari, by Barrett, which he had just seen in Buckingham Palace. Soyer's face was in the picture and the likeness was a good one.

Our hero was commonly known in the Crimea as The Great Soyer. Thackeray is supposed to have portrayed him in the person of Alcide Mirobolant, a minor character in "Pendennis," which came out between 1848 and 1850. Mirobolant is one of the innumerable grotesques wrought by an incorrigible satirist who parodied his own verses and though reaching sublime heights with his pen manipulated a pencil that never got above clever ridicule. It is hard to accept Mirobolant as more than a caricature of a man honored and esteemed by Florence

¹ Of the 62 crosses, 48 went to officers and men of the Army, and 1 of these was conferred on Assistant Surgeon T. E. Hale, of the Seventh Regiment. (Four civilian doctors, 5 medical officers of the army and 5 medical officers of the navy were in the list of decorations previously conferred by the Legion of Honor.)

Nightingale, herself the victim of Punch (with which Thackeray was associated for years) until her services to the nation compelled that publication to make the amende honorable.

Soyer's reminiscences abound with letters from officials and officers of all ranks attesting his valuable services to the British Army. Like every real cook he knew the value of testimonials, and, besides, as he was on friendly terms with most of the writers this fondness for documentary souvenirs was a natural one. It was very natural, too, that the author should desire to establish on some other word than his own the fact that he was doing something for the country and not merely sightseeing and enjoying himself, as the superficial reader might conclude, for the narrative is frank and fearless as well as naïve. Finally, the state of public feeling during and after the war was such that while the heartiest tributes were universally paid to courage and fidelity there was a strong disposition to try to fix the blame for the many errors of judgment, the neglect, the ignorance which led to so much needless suffering and loss of life. Many and remarkable were the labors of the commissions appointed to inquire into the conduct of the war and still more remarkable was the conflicting testimony obtained. Soyer may have apprehended something of the kind and while he had nothing to fear himself, he was a man of experience and education and in undertaking a literary venture more dignified and pretentious than his previous publications appreciated the value of corroborative evidence. One wonders if he required much collaboration to prepare for press at home the notes made in the field. Presumably not. He sent numerous letters to the home papers whose style and general tenor resemble his book. It is not likely that he asked assistance in writing the letters or that his associates on the ground had the time to render it. He appears to have had a fairly wide range of information, for though invoking oftenest the authority of Vatel,¹ Brillat-Savarin,² and other high authorities of his profession, he refers to Byron, Hippocrates, Burns, Shakespeare, and others. His eagerness to increase his knowledge of everything pertaining to his art was intense, but he had a keen, intelligent interest in things outside of it.

His love of fun and his quickness of repartee were remarkable, and he was a fearless practical joker. It required courage to keep the captain of a ship on tenterhooks of suspense at 2 in the morning to

¹ Vatel, chef of the Condé family at Chantilly in the reign of Louis XIV. He committed suicide (1671) because the pièce de resistance, a particularly fine fish, failed to materialize in time for a banquet offered by his master to the king. (*Lettres de Madame de Sévigné*.)

² Brillat-Savarin, a writer on political economy and law but chiefly famous for his *Physiologie du Goût*, a treatise on good dinners. Savarin fled to America during the French Revolution and played in the orchestra of a New York theater. After the fall of Robespierre he returned to France.

learn how he could divest his command of rats. Soyer detailed at length the steps in their capture. Large supplies of cheese were to be disposed about the vessel where the rodents could easily get at them on several successive nights until they got to counting on the supply as a regular thing. Then the practice was to be discontinued. The rats would assemble as usual but find nothing. The captain, shivering in his deshabille wanted to know how that would accomplish the purpose of stopping them. "Why, of course, finding nothing, they will all be taken in," said Soyer, bringing his long directions to an end. The captain swore roundly and rushed sneezing to his cabin.

In 1848, while dining in a Haymarket restaurant, Soyer expressed rather emphatic opinions on the political happenings in Paris, and thus provoked the wrath of a noted French duelist, a naval officer, present and was challenged to fight. Soyer agreed, and as the challenged party claimed the right to choose the weapons. "I suppose we must pull triggers then." "Pull any mortal thing you please," said the irate officer. "Good," said Soyer, "then we will pull each other's hair." This sally produced a roar of laughter from the bystanders and the challenger joined in the merriment when informed who Soyer was, and that his mission was to make people live well, not die badly.

"We thought you had gone back to England," was the greeting of many a friend when he returned to Balaklava after his illness. "I did," was the prompt answer; "what you see is only my shadow dressed up in my clothes."

When a Sardinian cavalry regiment was being disembarked, the colonel came aboard the port officer's ship in great excitement because of some inevitable delays and clamoring for forage, but more particularly for water for the horses. No one could understand him except Soyer who happened to be present and assured him there was none available then but that all would be attended to in due time. The colonel continued to vociferate and gesticulate so Soyer offered soda water as the only thing on hand, and suggested that as it retailed at a shilling a bottle he better get it in large quantities. The officer caught the word "water" and declared that would do, but when the steward came up with six bottles of soda on a tray he became furious. Soyer mollified him by opening a bottle of sherry. The colonel was soon convinced that sherry went better with soda than brandy, even, and as the water barges came alongside about this time everybody was satisfied "and thus ended the Sardinian revolt in the harbor of Balaklava on the 14th of May, in the year 1855, beneath the ruins of the Genoese Tower and fortifications built by their ancestors."

On one occasion an officer loaned Soyer his pony. When his errand was attended to and Soyer came out to mount, the animal had disap-

peared. Some one kindly gave him another steed and he went in pursuit of the lost one. The quest consumed several days and ended in the loss of the second horse. The story got abroad in exaggerated form and became the joke of the camp. The chef was credited with losing in three days four horses which did not belong to him. Soyer vowed that this proved what a trustworthy person he was. Any fool could lose his own horse but it required rare skill and high standing in society to lose four horses belonging to other people and in so short a space of time!

His zouave was arrested for galloping through the French camp in violation of local regulations. They were going to confiscate the horse and put the man in prison. Soyer arrived at the critical moment and assured the gendarmes that it was the horse who was to blame as he had run away. "Put him in prison and the rider in the pound." The laugh that followed smoothed out the situation.

Describing the appetite of the guests at a certain dinner to whose success he contributed, Soyer said that all the dishes were devoured except those on the bill of fare—which was not eaten!

His zouave was making a sketch of the harbor, but owing to the heat of the day he sat in Soyer's hut, going out occasionally to look at the scene before him and then returning to shelter to transfer it to paper. The artist correspondent of the Illustrated London News, Mr. Landells, angered the zouave by reproaching him for putting things in the picture which were not in sight. "D—— it, did you not see me turn the corner?" said the latter, who resented ridicule. "Don't interrupt my artist," cried Soyer, "he is a regular Turner—round the corner, I mean."

The account of a dinner given by Soyer, as return for some of the many hospitalities extended to him, is characteristic. In his leisure moments he made elaborate preparations, "not only to please but to astonish" the illustrious guests. He calculated on being able to accommodate 54 with ease or 60 if "packed like sardines in a box," so he limited the invitations to 50 after measuring the available space to an inch. Half a dozen soldiers were sent in every direction to collect wild flowers for the table and a profusion of paper lanterns and glass lamps were disposed about the inside and outside of the hut. By noon of the appointed day the place was ready except for the removal of about a ton of mud which had accumulated during the course of the preparations. The turf, which had been freshly laid down a few days before, had been scorched by the heat of the sun, and realizing that it would not present the pleasing appearance he desired, Soyer set a couple of men to work to paint the grass with a pot of opal-green paint. The effect was superb and caused some horses picketed near by to make frantic efforts to reach the spot. In spite of many alarms and disappointments,

fresh waiters, an extra cook, American ice, and needed supplies of crockery and bread arrived in time and the party was so successful that at 5 o'clock in the morning some of the guests were still singing, doubtless inspired in part by the liberal indulgence in a punch known as the Crimean cup à la Marmora, invented by Soyer not long before.

Above everything, Soyer was kind-hearted and full of ready sympathy. Sailors and soldiers are always getting hurt by careless handling of shells and cartridges picked up as souvenirs or playthings after a battle. Soyer happened to witness a serious accident of this kind. "We did all we could to alleviate their sufferings. It was extremely awkward to meddle with the first, who remained perfectly motionless, and no hospital was near nor doctor to be obtained. I gave a French soldier 5 shillings to run to the French camp and fetch a doctor; he did not succeed, but returned with a stretcher. I also sent to Sebastopol, but without success. I had just tied the poor fellow's leg very tight above the knee in order to stop the loss of blood, when Gen. Dacres and a number of officers who heard the report came to the spot."

He overlooked mistakes and disobedience in his subordinates, even when great inconvenience to himself resulted, and was always ready to help people in trouble, whatever their station.

Before leaving the Crimea Soyer made an extensive tour of the terrain so recently the scene of heroic endeavor. For miles nothing was visible but deep ravines, deserted roads, empty ruins of hospitals, and vestiges of camps. Finally he came upon a wretched horse standing near a pool of blood, a wreck of the war, which had been shot but not killed. "I gathered him a heap of grass, gave him some water from an adjacent rocky rivulet, washed his wound, and, to my regret, abandoned him."

The Crimean War stands out as one of the inexcusable episodes of modern history. France's professed reason for fighting on the side of Turkey against Russia was the right to guardianship of the "holy places" in Palestine and protection of Christian interests in Asia Minor, but dynastic considerations, the need of military prestige to connect the new self-made Emperor with his great namesake through deeds of valor following the coup d'état which overthrew the Republic, were the real motives. Great Britain was actuated by apprehension for the security of its hold on India, distrust of Russia being an intrinsic part of its foreign policy. Sardinia, under the inspiration of Europe's most brilliant diplomat, Cavour, sent 18,000 men under La Marmora to gain recognition as an influential factor

in European affairs, earn a title to participation in the congress that would later settle the terms of peace, and so be in a better position to continue its struggle for the national independence of a united Italy.

The immediate consequences of the war, politically speaking, were remarkable. Turkey was stamped with the approval of three Christian nations, its power consolidated, its right to existence reaffirmed. In return it gave solemn but worthless pledges of good behavior toward the Sultan's Christian subjects. Russia was to leave Sebastopol in its dismantled condition and to keep no armed vessels in the Black Sea, a body of water washing its southern shores for hundreds of miles, and to which, at least within the proverbial 3-mile limit, the designation "Russian waters" could properly be applied. These restrictions continued in force somewhat longer than Turkey's good behavior. Italy gained the recognition sought, its well-organized and valiant bersaglieri having made a most favorable impression. Napoleon acquired a fatally false conception of the prowess of his arms destined to disastrous reverses in the struggle with Prussia. England's fears of Russian encroachments in the direction of India were but temporarily allayed.

From a military and humanitarian standpoint the world received a striking demonstration of important principles through the colossal blunders of England, to whom the further chastening experiences of the Boer War were a necessity in order to perceive and remember that mere valor wins battles and campaigns only at the most frightful cost of human life.

Modern history scarcely affords a parallel for the mismanagement, ignorance, and stupidity which did so much to negative the generous intentions of the people at home, the liberal disbursements of Government, and the heroic courage of fighting men in the Crimea. Never were British troops more enthusiastic, more courageous, more patient under hardship than in this war, and rarely was there more utter miscarriage of plans, more defective organization, a more faulty system of administering affairs, both at home and at the seat of war.

Unfortunately the lesson of the Crimean War has not even yet been thoroughly learned. We still breed military commanders who nourish the medieval idea of the self-sufficiency of the "fighting arm" and in whose minds there is a deep gulf fixed between the man who fires a gun and all other men, whether they build bridges, roads, and storehouses, run engines and motor trucks, prepare food, or care for the sick, as if the fighting arm could deal effective blows for a body without brains to direct and nerves to coordinate its movements, without legs to transport it, a mouth to receive and internal organs to digest and distribute vital nourishment.

The recent war has revealed to those who reach below the surface of things and seek to derive broad generalizations from apparently

dissociated facts that war, to be waged with economy of blood and treasure, must engage the services of the entire nation. It takes only the perspicacity of a schoolboy to appreciate that ordnance foundries and munition factories alone can not furnish the needed equipment; that this equipment depends on every variety of industry—leather, cotton, wool, copper, radium, etc.; on chemistry, engineering, and medicine, on railways and ships. This conception carried into the domain of military administration and intelligently applied makes the various branches of an army a unit and brands as puerile the argument of "military necessity" through which details of food, transportation, and medical service are sacrificed in any considerable operation or widely extended movement.

The highest estimated average strength of the British forces in the Crimea (army) was 47,751, in September, 1855. The largest number of deaths from zymotic diseases in any month was 2,761, in January, 1855 (when the total strength was 32,393). In the same month, January, 1855, the deaths from wounds and injuries were 83 and from all other causes 324. The largest number of deaths due to wounds and injuries for any one month was 287, in November, 1854, when the deaths from zymotic diseases were 844 and from all other causes 106, and the total strength of the land forces was 29,736. The nearest approach to this was in September, 1855; 276 deaths from wounds and injuries, zymotic diseases 189, all other causes 20 (average strength 47,751). The total deaths for the campaign were estimated by Lord Panmure, speaking before Parliament, at about 20,000, of which less than 4,000 were due to wounds.

An English writer has stated that the mortality of the army in the Crimea in January, 1855, exceeded the proportionate mortality of London during the great plague of 1666. The mortality among the troops was due to fever, dysentery, scurvy, and cholera. "It has been stated that the siege of Sevastopol was undertaken by an army unprepared for lengthened military operations. Nothing had been organized, either for sheltering, clothing, or feeding the troops. No scheme of diet or ration appears to have been intelligently considered, and no transport was organized either for bringing supplies or for carrying away the sick. An admirable basis of operations was secured by the possession of Balaclava; but it never appears to have been considered practicable to connect the base with the camp by a passable road. The fierce winter of the Russian steppe swept over the scene of military operations and found the men unsheltered from its blasts. Blankets and clothing were piled up at Balaclava, while men were perishing from cold and frostbite 6 miles off, without any arrangements for either obtaining or transporting that covering for the lack of which they were perishing. The commissariat had

thousands of cattle, its own property, in Turkey, and the hills of Asia Minor teemed with stock at some 30 hours' distance by steamship, and yet the department was unable to bring over its own cattle or to purchase supplies, any amount of which could have been at once obtained. Fortunately the commissariat had at its disposal salt beef and biscuit, otherwise the army might have perished from hunger. Unfortunately it did not supply any other food and the army all but perished from scorbutus. But this was not the worst; there was the greatest difficulty in conveying the salt beef and biscuit to the front, and even when it had arrived there there were neither camp kettles nor fuel to cook it with, although any quantity of wood and coal might have been obtained, as it afterwards was obtained, from the opposite shores of Asia Minor by merely sending for it.

"Another of the notable expedients of that time must not pass without record, that of sending out green coffee to men who had nothing whatever to roast or prepare it with. It was the crowning touch in that system of mismanagement which has lowered the prestige of England and which almost cost her her fair name.

"The destruction of life was in itself so awful that men forgot for the time the loss of national honor. And if the national honor was retrieved—and it was most nobly—it was done by the starving, half-clad soldiers of Inkermann and by the heroic sufferings which they endured without complaint during the winter which succeeded that battle of heroes.

"As it has too frequently happened in the history of our wars a remedy was found for the evil after it was done. Public indignation at home at last told upon official incapacity in the East. Government, or, more properly speaking, the people, took the matter into their own hands. They tore the official covering to rags, and at a great pecuniary cost to the country they at last undid the mischief which a system of administration, avowedly founded on public economy, had perpetrated. Unfortunately, they could not recall to life the brave men who had perished. Two commissions were sent out, one for the army supplies, the practical result of which was that the troops were properly clothed and fed; the other, for executing sanitary improvements in camps, huts, and hospitals."

Hospitals at the front were numerous, but the great base hospitals were at Scutari (on the Bosphorus opposite Constantinople) and vicinity. In transporting sick and wounded by water from the Crimea to the Bosphorus, a distance of 300 miles, 74 out of every 1,000 died on the way. The hospitals at Scutari had no water-closets and were defectively drained. They were unventilated. Effluvia from sewers blew through the wards. They were swarming with rats.

Dead dogs in the last stages of decomposition lay about the premises. In February, 1855, the mortality was 427 per 1,000 of cases treated. "No adequate preparations were made by any of the departments, either for providing beds, washing, covering, food, or comforts; and the nursing of the sick was at first wholly inadequate. These deficiencies were gradually removed, although at the cost of breaking through all system, so that matters affecting the care, nursing, and comfort of the sick were improved during the winter. In the second week of March, 1855, the works recommended by the sanitary commission were begun, and were carried out as rapidly as possible. Windows were immediately broken to admit of the escape of foul air, and sailcloth flaps were at once placed over the mouths of the sewers to prevent the wind blowing through them into the hospitals; the hospital drainage was improved and flushed; the hospitals were cleansed, ventilated, and limewashed; the numbers of sick were also reduced, and nuisances were removed. From that time the sick had every requisite for recovery, of which they were destitute during the winter months."

But good springs out of evil. The horrors of the Crimean War furnished the opportunity for the unfolding and fruition of the genius and devotion of Florence Nightingale of whom the world knows in a general way, many people supposing that we are indebted to her for the idea of trained nurses and for the introduction of them into the theater of war. This conception is inaccurate and at the same time falls far short of doing justice to the immortal achievements of one in whose character were strangely blended, sweetness and sarcasm, deep spirituality, and practical common sense, masculine vigor and feminine gentleness, resolution and resourcefulness, persistency and tact. While the Red Cross movement and *organization* is due in large measure to Henri Dunant, a Swiss philanthropist, whose *Souvenirs de Solferino* (1862) pictured to the reading public the horrors of war, the first broad exposition of the Red Cross *idea*, the first systematic prosecution of welfare activities, was due to Florence Nightingale. She not only exerted herself to secure skilled nursing and suitable food for the sick but felt a deep and lasting concern for the living conditions of the soldier, sick or well, her interest and endeavor continuing unabated after the war was over. During the war Florence Nightingale brought about the establishment of money-order post offices so that soldiers might send home a part of their pay for the support of their dependents and encouraged and helped the men to write home. She organized measures of relief for the wives of noncommissioned officers and men who accompanied the Army to the East and were exposed to much hardship and suffering; sought by the establishment of cafes, etc., to neutralize the

demoralizing effect of the canteen; provided entertainment and occupation for convalescents; even urged the establishment of a service medical school in the field.

A warm admirer of Miss Nightingale, trusted and relied on by her, associated with her in many important enterprises, forms the subject of this sketch. His sphere was a humbler one than hers and far more circumscribed. In birth, rank, training, and general viewpoint Florence Nightingale and Alexis Soyer were far apart and the scope of their work can not be compared, but they labored with feelings of mutual esteem in a common cause and many times their names were linked together by their contemporaries as alike deserving of fame.

REFERENCES.

- A Culinary Campaign, by A. Soyer, 1857.
- Invasion of the Crimea; by Alexander William Kinglake. Fourth edition, 1863.
- History of the Crimean War, by E. H. Nolan, 1857.
- Life of Florence Nightingale, by Sarah Tooley, 1904.
- Sanitary History of the British Army during the Late War With Russia. 1859.
- Military and Surgical History of the British Army during the War Against Russia, by Andrew Smith, 1858.
- Life of Florence Nightingale, E. F. Cook, 1913.

EDITORIAL.

MORALE.

Advertising is the flywheel of American business and apparently with the increasing attempts to put naval administration on a business basis we have developed an inordinate desire for publicity. In order to popularize desirable measures based on the unusual thing called common sense it seems that they must masquerade under new titles because the magic of a catchword often carries conviction where sound argument fails. Then comes the exaggeration of a wise suggestion converting it into a fad and an abuse. Essential things of equal importance are neglected. Too often the fuss and feathers which mark the rediscovery of a partial truth obscure underlying principles patent to the old and experienced but neglected by amateur reformers. Without an appreciation of these principles the staff of a hospital will labor in vain for a high morale—that state of body and mind most conducive to efficiency.

This word morale is the overworked one just now. Its meaning is not always clear to the reformer, but it covers everything from medals to misconduct and as the passing pet of philanthropy and patriotism attracts universal attention. We may leave philanthropy to the Red Cross and patriotism to the greatest public professor of it, the politician. The Navy's concern is to develop efficiency within itself and it should be generally recognized that contentment, so vital to efficiency, depends, in military life at least, very largely on justice in administration. Magazines and moving pictures, parties and pleasure trips, Christmas presents and petty comforts are wasted on men who do not get their rights or think they do not. It is not the caressing hand that is wanted but one which can hold the scales of justice without a tremor and put into the pan the proper weights. It is not the glance of simulated or even real affection and interest that gives lasting satisfaction but the eye which sees every vital matter in its true light and distinguishes the guilty from the innocent regardless of sleeve ornaments or the contents of the morning mail bag.

The contentment and consequent efficiency of a hospital depends more than anything else on the force and intelligence which the commanding officer can bring to bear on just administration. It is injustice if the patient does not receive proper fare, nursing, and professional treatment. It is injustice if one who misbehaves does not receive adequate punishment and the exact punishment prescribed

by regulations for his offense. A published schedule of punishments is indispensable. It informs all those who are subject to regulations of what they may expect and should protect them from variations that may arise, in a one-man government, due to the vagaries of a frail mortal whose temper fluctuates with digestion and may be seriously disturbed by a morning diatribe from his wife or from having run out of his favorite brand of cigars.

In the Navy a man who receives the prescribed and adequate punishment for his offense is not resentful. On the contrary, he is almost grateful. The feeling in every naval institution must be that offense and penalty are inevitably, unfailingly related. It is not what a man may expect, it is what he knows he will get, what all his messmates know he will get, that counts. There must be no favorites. No amount of good will on the part of hospital corpsman, nurse, or ward officer won by useful work in the ward or pleasing personality or past performance of any kind must be allowed to avert, when there is an infraction of discipline, the consequences sure to be visited on a less popular patient.

On the other hand, there must be no abridgement of privileges by subordinates. Whether the hospital corpsman "forgets" to enter a man's name on the liberty list or the ward officer scratches it off, there is deprivation of liberty and that is a punishment. If there was sufficient reason for curtailing a legitimate and general privilege which passes for a right, there was justification for making a report to superior authority. Informally settling matters out of court is a dangerous practice.

Frivolous, vague, and unsubstantiated charges are not to be tolerated. If guilt exists and can not be proved, the result is demoralizing to the delinquent; if it is trivial and the man proved guilty but goes unpunished, the general effect is bad.

Much disorganization will result in a hospital where subordinates are partial, domineering, or indiscreet. Such things are not readily discovered unless there is frank and free communication between the commanding officer and everyone subject to his authority. Hence the right of any patient or attendant to communicate with the commanding officer should never be restricted, though, of course, the man who exercises this right about trifles must stand the consequences.

The great enemy to morale is not drink or lust or physical hardship, but the sense of wrong endured. To feel aggrieved and helpless under persecution or misjudgment is to grow lax and insubordinate and become a potential deserter. Unfortunately, men are not grateful, good, deserving in proportion to the blessings they enjoy. Likewise, the consequences of discontent are not in proportion to their cause. The petty grievance may be, generally is, as powerful a disintegrating factor as some serious miscarriage of justice in so far as

the individual is concerned, but where the members of a given unit are aware that in the main its affairs are administered firmly, impartially, intelligently, the unreasonableness of one pouting individual is usually recognized. In a naval hospital not 3,000 miles from where these words are penned a disgruntled patient declared that he was going to report the commanding officer to the Navy Department. His messmates dissuaded him from this step by a very emphatic threat to throw him in the river.

It is not to be implied from the above that discipline is the easy and simple road, a short cut as it were, to morale or contentment. Far from it. The proper administration of discipline and the satisfaction of the legitimate claims or rights of the personnel of a hospital, ship, or station present the most difficult of problems. The writer's view is rather that sometimes the measures advocated to promote the new morale are really an unconscious subterfuge, an attempt to obviate the difficulties inherent in the prime factor of morale—a square deal to all. To give that square deal becomes harder and harder as our appreciation of the problem deepens. It means that the commanding officer must know everything that goes on; must properly estimate the capacity and limitations of members of his staff, assigning them to duty for which their powers are commensurate; must have discernment along with firmness; must understand human nature as well as know regulations; must be generous and courageous, firm, patient, and self-controlled, if he would have success in the fascinating game of skill known as handling men. If he attempts this with false standards and by claptrap methods dismal failure awaits him. All the outside assistance in the world, all that money or love or influence from without can effect will not bolster up the man who relies on these things.

We may load men with athletic uniforms, flood them with good literature, offer trophies to arouse the competitive spirit, sicken them with festivals and occasions for merriment, but we can not make them play baseball with zest or row with enthusiasm, read our books, eat our cake, laugh at our jokes if they despise us. It is pleasant to inspire their affection, but it is not indispensable to success in handling men—that is, in handling them with a view to a useful purpose. The one thing needful is their respect.

The one thing needful, the thing to which so many trifles contribute and from which so many things flow in the development of morale in military life is the deep-seated, abiding respect of subordinate to superior. Loyalty and something very like affection spring from it. The surest way to earn that respect is to inspire the subordinate with the conviction that the superior's supreme purpose is to give him a square deal. In a word, a distinction must be made be-

tween valuable accessories to the creation of proper morale and the general policy essential to it. If he is sufficiently enlightened, adaptable, and progressive to be alive to the needs and requirements of his men under present conditions the commanding officer will secure for them most of the things supposed to promote contentment and efficiency, but he will do it through an appreciation of discipline in its highest sense, conceiving discipline as the full and prompt discharge of reciprocal obligations from all the components of a military unit. Blind enforcement of regulations does not meet the requirements. Regulations must be observed with a full recognition of every side of a man's nature and an ever present realization of the dignity of the individual man and of the existence, in the man as well as in the officer, of a soul.

In a campaign for elevating morale some publicity may be necessary in order to arouse that public interest on which financial aid depends. The professional philanthropist has so shaken the public confidence that it is difficult to secure contributions for confidential enterprises. But within the service itself publicity is baneful and the word "morale" should not be bruited about. The sailor is liable to confound it with moral and morals and he, in common with the manly youth of all classes, resents being the object of any sort of missionary effort.

The most compelling influences, whether for good or evil, are the subtle ones which operate without ostentation, in silence, unperceived. No organized effort to exert influence need be ashamed of masking its batteries and making indirect advances. "Surely in vain the net is spread in the sight of any bird." (Prov. I, 17.)

SPECIAL ARTICLES.

VENEREAL STATISTICS OF THE ARMY AND NAVY.

A STUDY OF CERTAIN PUBLISHED REPORTS.

By C. E. RIGGS, Captain, Medical Corps, United States Navy.

In a recent article (1), "Factors making for a low venereal record in the Army of the United States," Col. P. M. Ashburn, Medical Corps, U. S. Army, has presented some statistics which were gathered in an unusual manner. The information from which the statistics were compiled was obtained by means of a confidential questionnaire which was filled out by the soldier himself and sent in anonymously. The identity of the individual remained concealed throughout. Facts concerning venereal disease and sex conduct were asked for. The soldier made his answer under circumstances of absolute privacy and complete freedom from personal responsibility. By this concealed method of inquiry it was expected to avoid any sense of shame or fear of accountability that might divert the soldier in his answer from the unvarnished truth.

On January 9, 1920, there was sent to 37 of the largest camps in the United States the following questionnaire:

1. Have you had illicit sexual intercourse in the United States during the past year?
2. If so, how many times?
3. Did you always use prophylaxis after such intercourse?
4. If not, how many times did you neglect it?
5. Did you acquire venereal disease during the year?
6. Did it result from intercourse followed by prophylaxis?
7. Did it result from intercourse not followed by prophylaxis?

By May 28, 14,444 replies from individual white men had been received and accepted for use. Of the replies, 34 per cent stated that they had not committed illicit sexual intercourse during the past year. Col. Ashburn concludes from this that "one-third of average white American men of military age are chaste, at least for considerable periods."

The remaining two-thirds consisted of 9,483 men who acknowledged 234,413 illicit sexual contacts, followed by 879 cases of venereal disease. But 184 men refused to answer concerning their having acquired a venereal disease. Col. Ashburn assumes that refusing to answer means that these men also were infected. He adds this number to the 879 admitted infections, making a probable total of 1,063 cases of venereal disease that followed 234,413 sexual con-

contacts. Accordingly, it requires on an average 220 illicit sexual contacts to successfully produce one case of venereal disease!

About one-half of the 234,413 exposures was followed by prophylaxis. If it be true that the expectancy for a venereal infection under such circumstances is only one for every 220 contacts, then I think that most physicians have been laboring under a misconception concerning the dangers of venereal disease through sexual promiscuity. This finding, however, is not in agreement with the deductions to be made from statistics that naval medical officers have compiled. The statistics from naval sources largely relate to the use of medical prophylaxis and were compiled principally for the purpose of determining the efficiency of this branch of venereal prevention.

No branch of venereal prevention has excited so much opposition as medical prophylaxis. Some believe that the cause of sexual purity is retarded by the use of these treatments and others that the actual prevention of a certain number of diseases is a just measurement of the good accomplished. Aside from this, there is another aspect to the case that is deserving of consideration. I refer to a certain enlightenment concerning the venereal problem and the venereal-disease problem which may be obtained by a study of the works of those who have conscientiously attempted by means of medical prophylaxis to suppress venereal diseases and carefully recorded the results of their efforts.

"Statistical data on venereal disease are urgently necessary."

(2) It is also important to avail ourselves of the data we now have. It is probably safe to assume that the venereal situation is at a standstill in practically no community. On account of social, economic and other changes the necessity for the gathering of venereal statistics is a continuous one. For instance, a recent change in this country is the passing of alcohol as an allied factor in the venereal problem. It is only by a careful study of the results of statistics that we may hope to estimate the magnitude of the venereal scourge, note the tendency to improvement or the reverse, measure the good accomplished by preventive efforts and avoid the making of harmful and ridiculous assumptions.

There are four sets of statistics prepared by naval medical officers that are available for analysis and comparison. These four sets are Diehl's (3) statistics from the Asiatic Station prepared in 1909; Holcomb and Cather's (4) from the U. S. S. *Delaware*, prepared in 1911; my own, prepared at the Norfolk Training Station (5) in 1916; and a comprehensive set gathered by the medical officers of the Asiatic Station (6), compiled by me in 1918.

All but Diehl's statistics are accompanied by prophylactic tables. By a prophylactic table I mean one in which the results of medical

prophylaxis are presented in tabulated form, giving not only the whole number of treatments with the number of resulting diseases, but, as well, the number of treatments for each hour subsequent to exposure and the resulting diseases for the corresponding hours. The three tables are given here for analysis and comparison, and are as follows:

TABLE NO. 1.—*Showing results of medical prophylaxis from the U. S. S. Delaware, the Norfolk Training Station, and the Asiatic Station.*

U. S. S. <i>Delaware</i> 1911.				Norfolk Station, 1916.			Asiatic Station, parts of 1917 and 1918.		
Hours.	Treat- ments.	Dis- ease.	Per cent.	Treat- ments.	Dis- ease.	Per cent.	Treat- ments.	Dis- ease.	Per cent.
1.....	13	0	0.000	1, 180	1	0.084	3, 453	31	0.897
2.....	69	0	.000	1, 172	7	.597	4, 400	73	1.659
3.....	128	1	.781	521	4	.767	3, 104	60	1.932
4.....	165	3	1.818	330	2	.606	2, 034	41	2.015
5.....	112	1	.891	199	3	1.507	1, 216	47	3.865
6.....	237	3	1.265	321	5	1.557	1, 179	42	3.662
7.....	75	2	2.666	277	6	2.166	742	30	4.043
8.....	586	9	1.535	390	16	4.102	862	41	4.756
Over.....	1, 890	83	4.391	713	37	5.189	2, 649	113	4.264
Total.....	3, 275	102	3.114	5, 103	81	1.587	19, 639	478	2.433

Not only were the three tables prepared at different times, but also the circumstances under which the data were gathered differ widely. While the work was being carried out on board the *Delaware* the ship was on a cruise, visiting ports on the Atlantic coast, in England and France, and on the east and west coasts of South America. The joint authors complain of the difficulties they encountered in carrying out their pioneer preventive work. They mention the hindrances of "overnight liberties," and that "a large percentage of the men came on board under the influence of intoxicants." Also "the question of veracity on the part of the men" required constant watchfulness in order to obtain reliable data.

At the Norfolk Training Station the work was conducted under more favorable conditions. Here alcohol was less a factor. There were no "boat hours" to hinder exposed men from promptly returning for treatment. Excellent treatment facilities were always available. When men became infected they were questioned in the quiet of a large office and spared the embarrassment they might feel if interrogated under the crowded conditions of the average sick bay.

Concerning the table from the Asiatic Station, the work was performed under "a wide variety of conditions." The table "no doubt contains many errors that lessen the apparent efficiency of early treatments." More than 40 medical officers independently took part in gathering the data. The environment in the East is for the

sailor the most destructive to morals to be encountered. Also there is a belief that the disease-producing organisms of the East, in particular the China coast, possess greater infectivity and virulence than the same germs in other parts of the world.

As the three tables were constructed mainly for the purpose of determining the so-called efficiency of medical prophylaxis, it will probably be well to discuss, now, just what is meant by prophylactic efficiency. From an examination of the above tables the importance of the factor of time is manifest. It is seen that the numbers in the columns marked percentages of failures increase to a certain maximum as the interval of time between exposure and the administration of treatment increases. It should be remembered that it is possible to administer hundreds or even thousands of treatments without preventing a single disease, provided sufficient time is allowed to elapse after exposure to the risk of infection. When the germs of disease have reached their site of inoculation, they require a certain number of hours to intrench themselves against the anti-septic attack of an ordinary prophylactic treatment. Given this period of time, prophylaxis is without avail. In other words, it is impossible to speak understandingly of the efficiency of prophylaxis unless the time factor is understood and expressed. To illustrate what might not at first glance be noticeable let us rearrange the numbers of treatments from the above tables in inverse order of their magnitude and calculate the probable number of resulting diseases by using the same percentages of failures as occurred in actual practice. By so doing only the time factor is disturbed and the results are as follows:

TABLE NO. 2.—*Showing the probable number of diseases with the numbers of treatments arranged in order of magnitude.*

U. S. S. Delaware.				Norfolk Station.			Asiatic Station.		
Hours.	Treatments.	Per cent.	Probable number.	Treatments.	Per cent.	Probable number.	Treatments.	Per cent.	Probable number.
1.....	13	0.000	.....	199	0.084	0.16	742	0.897	6.65
2.....	69	.000	.....	277	.597	1.65	862	1.659	14.30
3.....	75	.781	0.58	321	.767	2.46	1,179	1.932	22.77
4.....	112	1.818	2.03	330	.606	1.99	1,216	2.015	24.50
5.....	128	.891	1.14	390	1.507	5.87	2,034	3.865	78.61
6.....	165	1.265	2.08	521	1.557	8.11	2,649	3.562	94.35
7.....	237	2.666	6.21	713	2.166	15.42	3,104	4.043	125.49
8.....	586	1.535	8.99	1,172	4.102	48.07	3,453	4.756	164.22
Over.....	1,890	4.391	182.98	1,180	5.189	61.23	4,400	4.265	187.68
Total probable numbers.....			204.01			144.96			718.57
Actual numbers.....			102.00			81.00			478.00
Probable increase.....			102.01			63.96			240.57

As stated, the percentages of failures for each hour after exposure are the same as those obtained in actual experience. By making no further alteration in the original tables than disturbing the accidental factor of time the results of the U. S. S. *Delaware*, the Norfolk Training Station and the Asiatic Station show a probable increase of 102.01, 63.96, and 240.57 cases of venereal disease, respectively. Of course, the numbers can be arranged to show a slight increase in efficiency. The point is that so far as the efficiency of prophylaxis is concerned, time is almost everything. To speak of prophylactic efficiency without making known the time factor, is something like asking the price of a horse, not stating whether the animal is to be purchased in Venice or on the plains of Mongolia.

There are two ways of stating the effectiveness of prophylaxis, neither of which conforms to the best statistical requirements. For example, prophylaxis is sometimes spoken of as being such per cent efficient (for instance 98 per cent), when it is meant that only 2 infections followed 100 treatments. This mode of expression seems to infer that 98 cases of venereal disease were prevented and that the treatments failed in only 2 instances. To say that the treatments failed in only 2 instances is correct, of course; but it is also true that nothing like 98 cases of venereal disease were prevented. It is probable that about 4 infections follow 100 exposures without prophylaxis, and, if 2 were prevented, then the treatments were actually 50 per cent efficient instead of 98 per cent. However, the number of infections that would have occurred had prophylaxis been withheld can not be definitely known. The 2 knowable quantities are the number of treatments and the number of cases of venereal disease appearing among those treated. Then it seems a little nearer correct to say that there were 2 per cent of failure instead of stating that prophylaxis was 98 per cent efficient. Of course, owing to the unknown factor the percentage of actual preventions or of actual failures can not be definitely calculated.

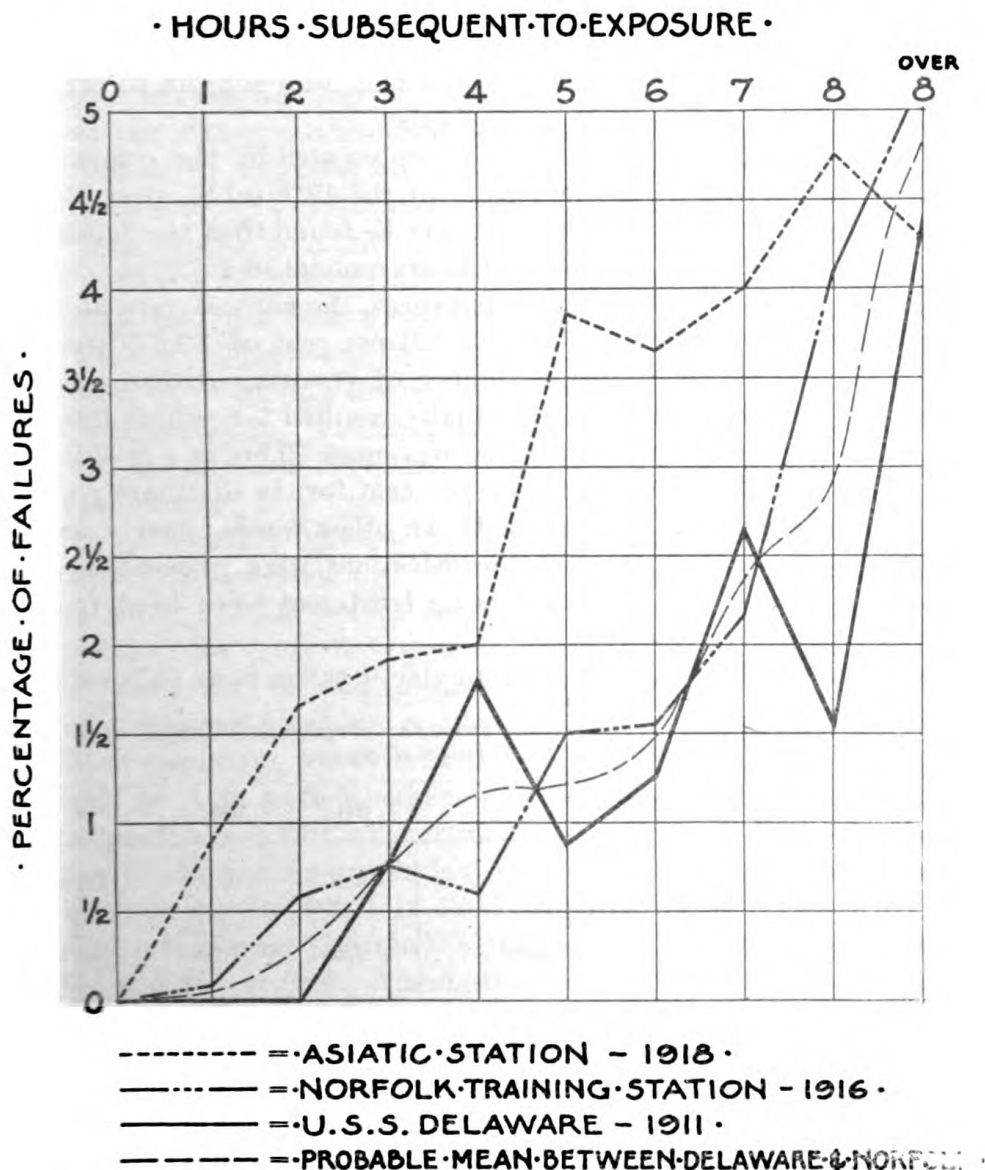
When the number of cases of venereal disease that have followed a certain number of treatments is known, it is a matter of convenience to express the resulting efficiency of prophylaxis as "percentage of failures." In every 100 men who receive treatment following exposure to the risk of infection, there are 3 conditions to be assumed. In the first place, a large number, say 95, may be expected to escape disease had the prophylactic treatments not been administered. Of the remaining 5, a certain number will contract disease in spite of prophylaxis and there will remain a third number, perhaps 2 or 3, who will have had their infections prevented on account of having taken prophylaxis. These last 2 or 3 instances of prevention constitute the reason for the justifiable trouble and expense incident to administering 100 prophylactic treatments.

Then, 100 treatments are given to prevent the infection of 5 men who are presumably in the very incipient stage of disease. For this reason, some persons consider the term "early treatment" to describe the purpose of the procedure more accurately than the term "prophylactic treatment." Besides, the term early treatment seems to circumvent the objections of a group of persons whose interest in the subject is largely ethical. To some, it seems to be a question of considerable importance as to whether the so-called prophylactic treatment should be classified as prevention or cure. Sir Thomas Browne, the physician-philosopher, has said "physic is either curative or preventive." Therefore it is presumable that medical prophylaxis is one or the other. It is not necessary to undertake the task of settling this dispute here. Early treatment or prophylaxis is now extensively used in the armies and navies of the world and to a considerable extent in civilian life. Its use will probably continue as long as there is a venereal-disease problem and long after the ethical disputes shall have ceased to engage the attention, and divide the judgments of so-called practical men and philosophers.

The argument generally made against artificial prophylaxis is that its use does away with the fear of disease which is considered by some a strong deterrent against immoral sexual conduct. In practice, physicians are well acquainted with the "never again" statements of those suffering from venereal infections. They also know how quickly such statements are forgotten when a cure is completed. Be that as it may, it would seem that fear of disease is a very poor substitute for genuine morality. Nor can the view that disease is a just punishment on the immoral be defended. Love of morality, not fear of the consequences of immorality, is the only standard of ethical worth.

With these qualifying conditions in mind, it will be interesting to examine the results in the three tables for agreements or the reverse. It is seen that in some instances the percentages are based upon numbers too small to admit of a general deduction. For instance, it is noted that in the case of the treatments of the first hours less than one infection is expected to follow every 100 treatments. Consequently, it requires several hundreds of treatments with the numbers of resulting diseases, in order to determine for this hour the probable percentage of failures. But, when 4 or 5 infections are expected to follow 100 treatments, as is the case for more than 8 hours, naturally it does not require so large a number of treatments to determine the average, or percentage of failures, as in the previous instance. It is more or less a matter of opinion as to how many treatments should be taken into consideration before the accidental feature is believed to be reduced to a practical minimum.

The three tables are represented graphically in the chart. The small numbers of the first and second tables permit a considerable accidental element which is manifested by the irregularity of their respective lines. The smooth line is the probable mean of the two irregular lines. It is not a straight line, but a curve with the concavity



upwards which means, in this case, that prophylaxis is not only most efficient for the first hour after exposure, but also that the efficiency diminishes in increasing ratio. Aside from the mathematics, it would seem to be a reasonable therapeutic deduction that these treatments rapidly lose their potency as time is permitted to elapse and become wholly valueless within a small number of hours.

The line for the 1918 table is almost straight. It is apart from the other two, showing a less degree of efficiency till the "over 8 hours" period is reached when all three lines are practically together. The probable reason for the 1918 line being without marked irregularity is that the large numbers of treatments in this case have reduced the accidental feature to a minimum. The lessened efficiency represented by this line was probably apparent instead of real. It was, no doubt, caused by the misstatements of infected men who sought to evade punishment for failure to take prophylaxis.

However, the prophylactic efforts, as represented by the comparatively inaccurate and inefficient results of the 1918 table, prevented many diseases. For from this table it may be found that the failures of the seventh, eighth, and subsequent hours amount to 4.326 per cent. Assume this to be, under such circumstances, the normal rate of infection without prophylaxis. Then, 4.326 per cent of 19,639 treatments gives 849 as the probable number of resulting diseases had prophylaxis not been used. There actually resulted 478 which leaves 371 as the probable number of diseases prevented. This is a probable efficiency for the treatments of 43.7 per cent, or, as ordinarily expressed, an efficiency of 1.88 per cent. In other words, nearly one-half (43.7 per cent) of the probable infections were prevented, or nearly 2 (1.88) per cent of those taking treatment were kept from disease.

A further analysis of the three prophylactic tables is as follows:

TABLE 3.—*Showing corresponding factors from the prophylactic tables of 1911, 1916, and 1918, respectively.*

Item.	1911	1916	1918
1. Total number of treatments.....	3, 275	5, 103	19, 639
2. Total number of diseases.....	102	81	478
3. Percentage of failures.....	3. 11	1. 58	2. 43
4. Number of treatments later than 6 hours.....	2, 551	1, 380	4, 253
5. Number of resulting diseases.....	94	59	184
6. Percentage of failures.....	3. 68	4. 27	4. 32
7. Number of treatments 6 hours or less.....	724	3, 723	15, 386
8. Number of failures.....	8	22	294
9. Percentage of failures.....	1. 10	. 59	1. 91
10. Probable number of preventions.....	18. 65	137. 10	371. 58
11. Actual percentage of efficiency.....	15. 40	62. 80	43. 70
12. Percentage of efficiency of treatments.....	. 56	2. 68	1. 88
13. Percentage of treatments later than 6 hours....	78. 80	27. 00	26. 70
14. Average number of hours for treatments of 6 hours or less.....	4. 33	2. 55	2. 80

This analysis also shows the interdependence of the various factors that promote or retard efficiency. For instance, in the 1911 table, items 3 and 12 show, relatively, a high percentage (3.11) of failures and a low percentage (0.56) of efficiency, respectively. The efficiency, or lack of it, of these factors is dependent more or less upon

the time factors of items 13 and 14. Item 13 shows that as much as 78.8 per cent of the 3,275 treatments for 1911 were administered later than 6 hours after exposure to the risk of infection, and by item 14 it is seen that the average elapsed time for the treatments of 6 hours or less is comparatively long; that is, 4.34 hours. Of course, the percentage of failures (item 3) plus the percentage of efficiency (item 12) should equal the percentage of failures for more than 6 hours (item 6).

Some of the findings in Table No. 3 concern the same subjects which the Army questionnaire sought to determine, and it will be interesting to see how the questionnaire statistics agree with the naval statistics. For instance, item 6 concerns numbers of exposures in which prophylaxis was presumably without avail, and the resulting numbers of diseases are presumably the same as though prophylaxis had not been used. In other words, the figures represent *the normal expectancy for venereal infection from illicit sexual intercourse*. For 1911 the percentage is 3.68, or 1 infection for every 27.1 exposures; for 1916 the percentage is 4.27, or 1 infection for 23.4 exposures; and for 1918 the percentage is 4.32, or 1 infection for 23.1 exposures.

The differences between these findings and those of the Army questionnaire are striking. The results compiled from the questionnaire show 234,413 sexual contacts followed by 879 infections, or 1 infection for every 266 contacts. But, the author goes on to state, if 184 men who refused to answer are added the ratio is 1 to 220. By eliminating a certain number of answers, there are left 85,040 contacts admitting 589 infections, or 1 in 144. But by adding 99 who refused to state as to whether or not they had contracted a disease, the expectancy is further increased to 1 in 123. Then by separating those who did not use prophylaxis from those who did, the expectancy without prophylaxis is 1 in 120.7 and with prophylaxis 1 in 172.4. This result is reached after the author excludes 8,485 men from the 14,444 accepted replies. Among the excluded replies there are groups in which the rate of infection varies from 1 in 1,229 to 1 in 1,596.

When comparing the figures from naval sources with those derived from the Army questionnaire it should be noted that the terms "exposure" and "sexual contact" may have at times some difference in meaning. Exposure means any amount of sexual indulgence while ashore on a single liberty; whereas, sexual contact means whatever answer the soldier chooses to make to the first two questions of the questionnaire, to the effect "how many times have you had illicit sexual intercourse in the United States during the past year."

However, the expectancies of one infection for every 23.1, 23.4, and 27.1 exposures are irreconcilable with that of no greater frequency

than 1 in 120 sexual contacts. It would seem that if the first set of figures are accepted as reliable, then the finding of 1 infection to 120 contacts should be discarded as valueless. The naval statistics were gathered under circumstances that vary greatly as to time and place. Yet the different findings are in considerable harmony and accord, which fact in itself is a good argument for the accuracy of the field work. Concerning the method of inquiry into venereal conditions by means of confidential questionnaires, there are, to say the least, "obvious limitations and errors to this method of investigation, and the accuracy of the conclusions is not above suspicion." (7)

Three of the four sets of naval statistics give the number of granted liberties, and therefore admit of comparisons along other lines than heretofore used. The three sets are as follows:

	1909	1912	1918
Total number of liberties.....	70,954	32,767	93,336
Total number of exposures.....	21,166	3,275	13,303
Number infected without prophylaxis.....	198	123	175
Number infected having used prophylaxis.....	401	102	478

Colonel Ashburn's finding that one infection follows every 120.7 contacts without prophylaxis and every 172.4 with prophylaxis may be applied to the infections in the above table for the purpose of determining the probable number of sexual contacts. For example, in the 1909 column, 198 infections without prophylaxis multiplied by 120.7 equals a probable number of 23,898.6 contracts, and 401 with prophylaxis times 172.4 equals 69,132.4 or a total of 92,031 probable sexual contacts. That is, given the number of diseases after prophylaxis and the number without prophylaxis, the probable number of sexual contacts may be readily determined. The actual number of liberties and the probable number of contacts, calculated from the above table for each year, are as follows:

	1909	1912	1918
Total number of liberties.....	70,954	32,767	93,336
Probable number of contacts.....	93,023	32,431	103,529

This gives a total of 197,057 liberties, which were responsible for at least 228,983 sexual contacts. The result is reached by using the highest rate of infection or the least number of contacts for one disease, and after excluding 8,485 of the 14,444 accepted replies and (to further increase the rate) adding 99 men as infected who failed to state whether or not they had been. By employing any other of

Colonel Ashburn's results the probable number of contacts, which is already considerably in excess of the number of liberties, would be materially increased. For instance, to quote the statistical part of the paragraph concerning the "Frequency of intercourse":

"The 9,483 men who admitted illicit intercourse during the year acknowledged 234,413 sexual contacts, an average of 24.8 for each man. They also admit 879 venereal infections, while 184 men refused to answer the question as to whether or not they had acquired venereal disease. It may be assumed that practically all of them had done so, in which event 11.2 per cent of all men indulging in illicit intercourse became infected in the course of a year, and there was one infection for each 220 illicit contacts. There were 117,210 acknowledged instances of the neglect of the use of prophylaxis and 384 acknowledged infections following neglect of it, or 1 infection in 305 exposures without prophylaxis; while there were 117,203 possible uses of prophylaxis and 407 acknowledged infections following its use, or one infection for, at most, 288 exposures with prophylaxis. In regard to the remaining 31 infections * * *."

From the above paragraph the following may be obtained:

	Sexual contacts.	Infections.	Rate.
Without prophylaxis.....	117, 210	384	305
After prophylaxis.....	117, 203	407	288
Total.....	234, 413	791	.....

According to this, the rates of infection are, without prophylaxis 305, and with prophylaxis 288, instead of 120.7 and 172.4, respectively. However, in this instance it is possible that an error has been made as the total number (791) of infections does not agree with the total number (879) in the quoted paragraph. If the deduction from the paragraph be used, it will be found that the 197,057 liberties were followed by 433,808 probable sexual contacts, which is a number beyond all probability.

The conclusion that one infection follows every 120.7 sexual contacts without prophylaxis and one in every 172.4 with prophylaxis tends to discredit the importance of medical prophylaxis as a practical measure. For, if the calculation be made, it will be found that the acceptance of this conclusion means that it is necessary to administer on an average 402.6 prophylactic treatments in order to prevent one disease. The conclusion is, of course, contradicted by the venereal statistics from naval sources as is shown by item 12 in Table No. 3. If the medical officers of the Navy were obliged to tell their com-

manding officers that it was to be expected that only one disease would be prevented by more than 400 treatments it is quite certain that they would not receive the cooperation and support in this preventive work which they are now given.

The finding from the questionnaire that one infection follows every 220 sexual contacts may be made of economic interest. According to the report of the Surgeon General of the Navy for the year 1919 there was admitted to record a total of 35,360 venereal diseases. In another analysis by Colonel Ashburn (8) of a similar questionnaire it is disclosed that 2,765 infected men paid a total of \$4,828.24 for their infection, or an average of \$1.74 per man. The Navy (9) has followed to a limited extent the questionnaire method of research and has found that 713 men paid on an average \$2.04 for their illicit indulgence. Now, the total number (35,360) of diseases multiplied by the probable number (220) of contacts per disease equals 7,779,200 illicit contacts, and this number multiplied by a cost per indulgence of \$2.04 gives an annual expenditure by the personnel of the Navy of \$15,869,568! The most surprising part of all this is that the above sum was obtained by the use of a factor taken from an article entitled "Factors making for a low venereal record in the Army of the United States."

CONCLUSIONS.

1. The normal expectancy for venereal disease resulting from illicit sexual intercourse, not followed by prophylaxis, is about 1 in 20 or 1 in 30.

2. The expectancy for venereal disease when prophylaxis is used depends almost entirely upon the factor of time. The absence of the time factor in a set of prophylactic statistics invalidates any conclusion that may be drawn concerning probable efficiency of prophylaxis. In actual practice the number of infections appears to be reduced by nearly one-half.

3. The questionnaire method of investigation, in which the identity of the individual is concealed, has proved unreliable and the results obtained can not be accepted with any confidence as to their accuracy.

REFERENCES.

- (1) Ashburn. Military Surgeon. Vol. XLVII, No. 2.
- (2) Edler. The Reporting of Venereal Disease by Physicians. Jour. Am. Med. Assn., Vol. 74, pp. 1764-1766.
- (3) Diehl. Venereal Prophylaxis on the Asiatic Station. U. S. Naval Medical Bulletin, Vol. 4, No. 3.
- (4) Holcomb and Cather. A study of 3,268 Venereal Prophylactic Treatments. U. S. Naval Medical Bulletin, Vol. 6, No. 1.
- (5) Riggs. A Study of Venereal Prophylaxis in the Navy. Social Hygiene, Publication 100.

(6) Riggs. An Analysis of 19,639 Early Treatments, etc. Military Surgeon, April, 1920.

(7) Moore. The Value of Prophylaxis against Venereal Disease. Jour. Am. Med. Assn., Vol. 75, No. 14.

(8) Ashburn. Notes on Venereal Disease in the Army at the Present Time. Military Surgeon, Vol. XLVI, No. 3.

(9) Bulletin No. 96, Division of Preventive Medicine, p. 7.

**REPORT ON A HUNDRED INFECTED COMPOUND FRACTURES CAUSED BY
HIGH-EXPLOSIVE SHELL FRAGMENTS OR MACHINE-GUN BULLETS.**

By A. L. CLIFTON, Lieutenant Commander, Medical Corps, United States Navy.

The material for this article was furnished to a great extent by the men of the Fifth and Sixth Regiment of Marines. Practically the entire number were old cases having been injured in France several months before they came under our observation. In practically every case there was a persistent sinus, many multiple, leading down either to the ends of the bone or to the medullary cavity.

In order to cover the subject more fully it is deemed advisable to place the cases under separate headings.

**SINUS LEADING DOWN TO THE FRACTURE AND NOT INVOLVING
THE MEDULLARY CAVITY.**

In this type of case it was found necessary to curette away only the necrotic bone, using gas anesthesia. The sinus was first outlined with bismuth, and stereoscopic plates were made which gave a fairly good idea of the extent of the bony involvement.

When the case came to operation great care was exercised not to injure the healthy periosteum, the ends of the bone were carefully curetted until sound bone was reached, every attempt was made not to open the marrow cavity to infection. Curetting the sinus tract was included in the operative procedure.

Aftercare consisted in using either Dakin's solution or dichloramine-T with early removal of any drainage. It was found that if all necrotic bone was removed the sinus would close up promptly, but if any diseased bone was left the procedure had to be repeated.

Many different methods have been devised for operating on these sinuses. One method was to inject methylene blue into the sinus under pressure and then open up the wound widely and incise all tissue touched by the methylene blue. I have understood that this operation not only did not prove successful, but was disastrous in several cases. It is certainly not well to open up the fascial planes, for a low-grade infection will light up and become virulent if given the proper conditions.

SINUSES LEADING DOWN TO THE MEDULLARY CAVITY WITH TUNNEL FORMATION.

This is probably the most difficult type of case to deal with. Several cases in this series were curetted two or three times before a tunnel was discovered. On widely opening the affected part the tunnel was found and was usually well walled off from the marrow cavity.

Here we are dealing with a rigid cavity which can not be filled by any surrounding tissue. There is a choice of two procedures: Either to fill the cavity with wax or fat, or to cut the shaft of the bone away so that the surrounding muscle can collapse in and fill the space.

As it is a very difficult matter to get these cavities sterile, it is better to remove a section of the shaft. This was done with good results.

A bone tunnel presents a problem similar to a pneumothorax following empyema. In the case of a pneumothorax the alternatives are to collapse the chest wall on the lung or decorticate the lung and allow the lung to expand out and meet the chest wall. In a bone tunnel there can be no expansion outward, so it is necessary to force the muscle to collapse inward.

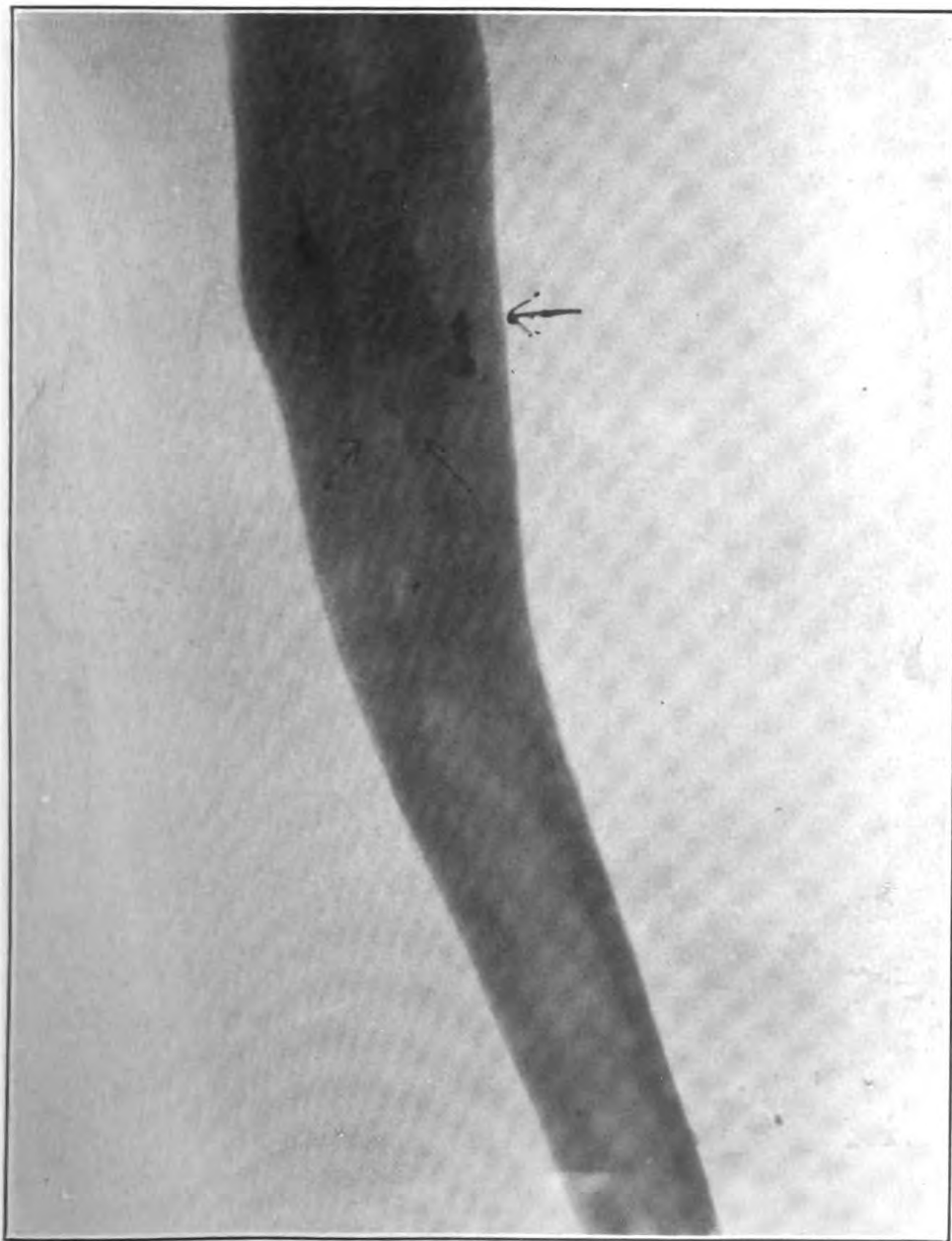
Undoubtedly there are many cases where this method of attacking the shaft of the bone would not be feasible because of the necessity of removing so much of it as to weaken the limb beyond the point of safety.

THE CARE OF JOINTS WHILE SUPPURATION IS CLEARING UP.

The necessity for special treatment of joints adjacent to fractures has been amply demonstrated in the care of war wounds. The old idea that a joint could be immobilized indefinitely or would take care of itself is certainly a great fallacy.

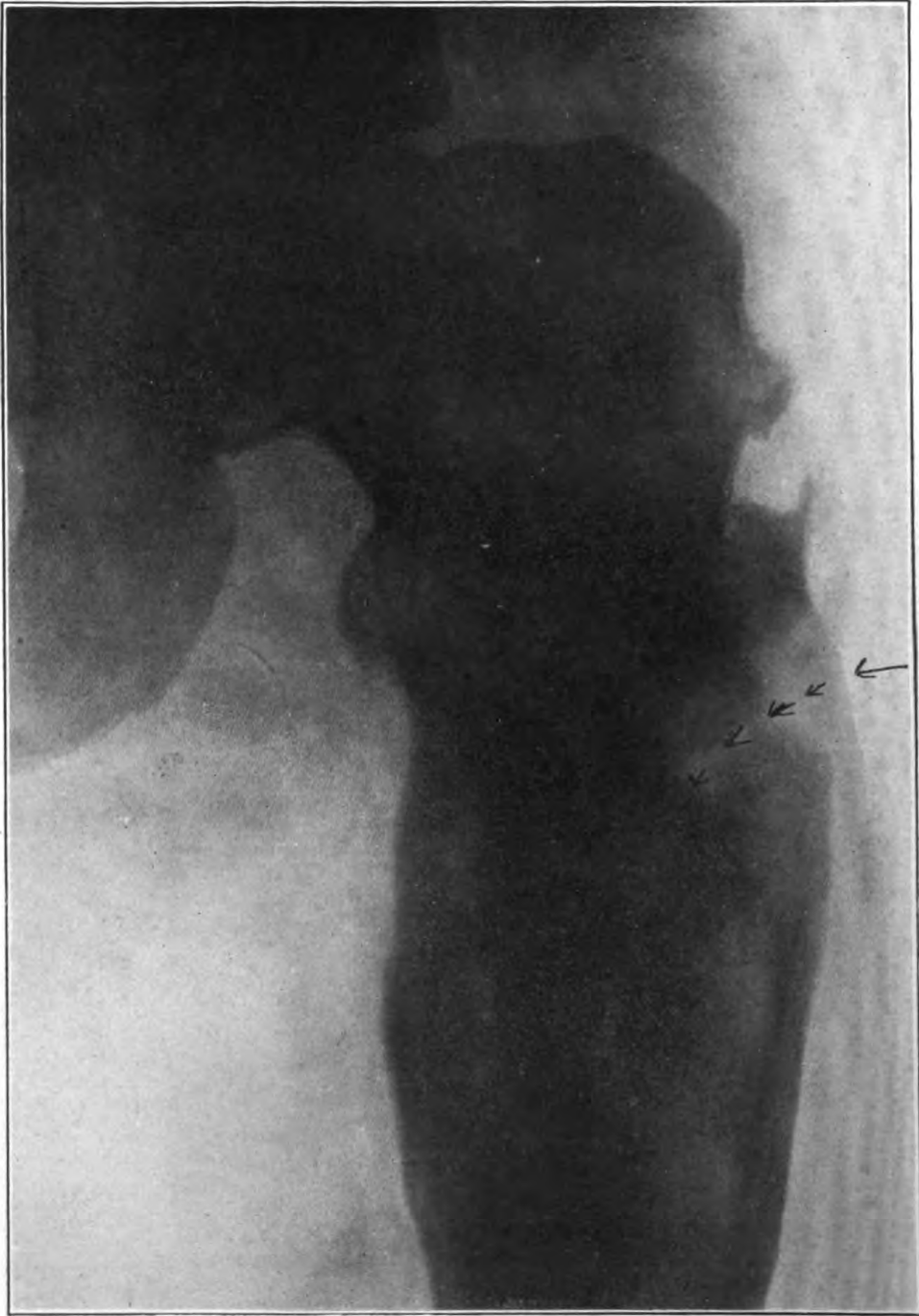
The fracture is immobilized with coaptation splints and joints adjacent to the fracture are moved daily, this treatment being supplemented with massage of the muscles of the part except close to the infected area. In cases involving the arm the finger movements are carefully watched and splints are applied, permitting the greatest possible motion. As it is sometimes months before these patients can be operated upon following cleaning up of the infection, the necessity of the above procedure is evident.

Joints that show fibrous ankylosis from long use of splints can be moved under gas anesthesia and splints applied, gradually forcing the arm or leg into flexion or extension, as the case may be. Numerous reports on the subject vary as to the efficiency of moving joints under a general anesthetic. We have found it very beneficial in some cases.



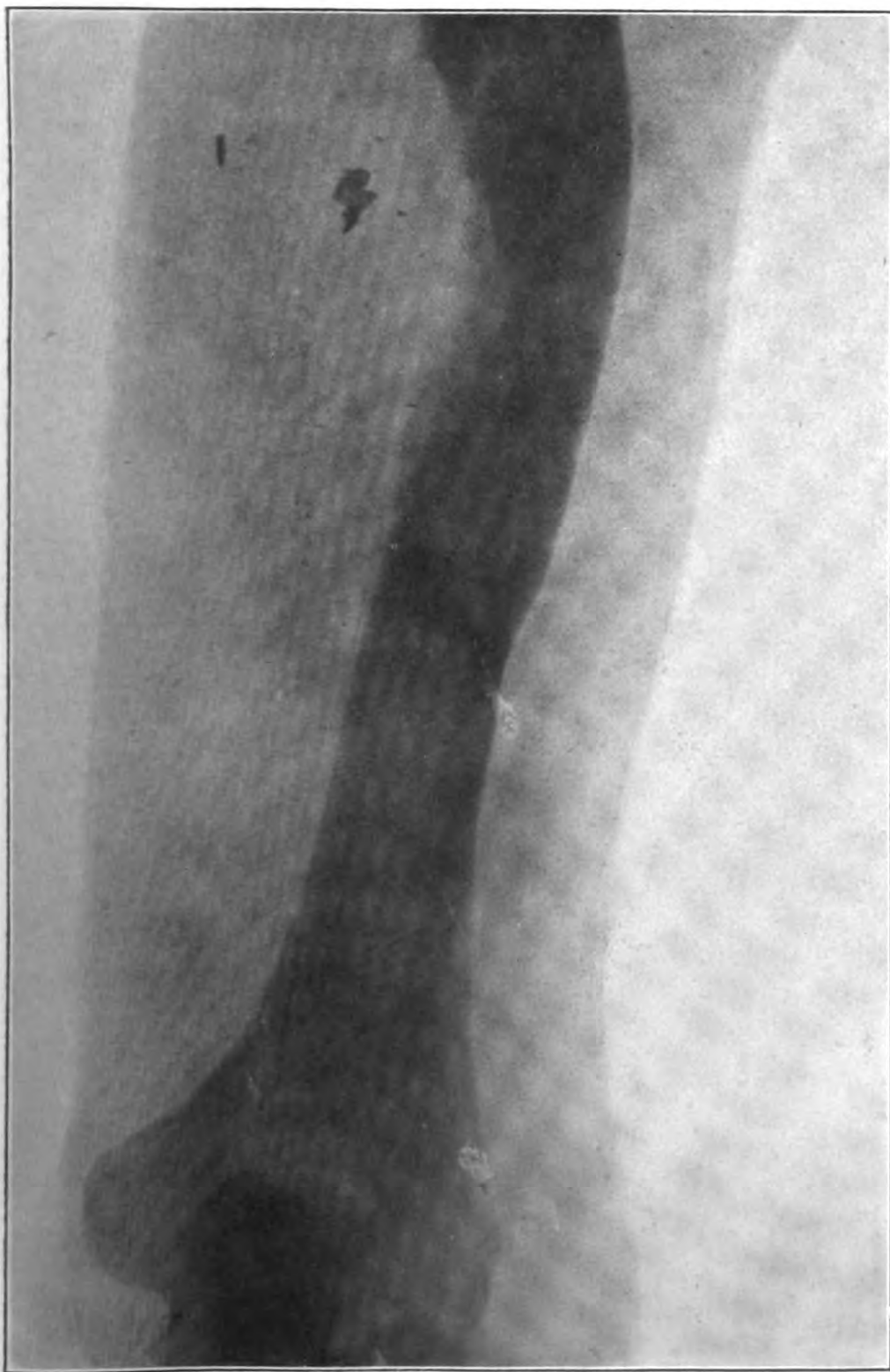
Bone tunnel in shaft of humerus.

192-1



Compound fracture of femur. Sinus had suppurred six months. X-ray shows tunnel of bone leading into the shaft.

192-2

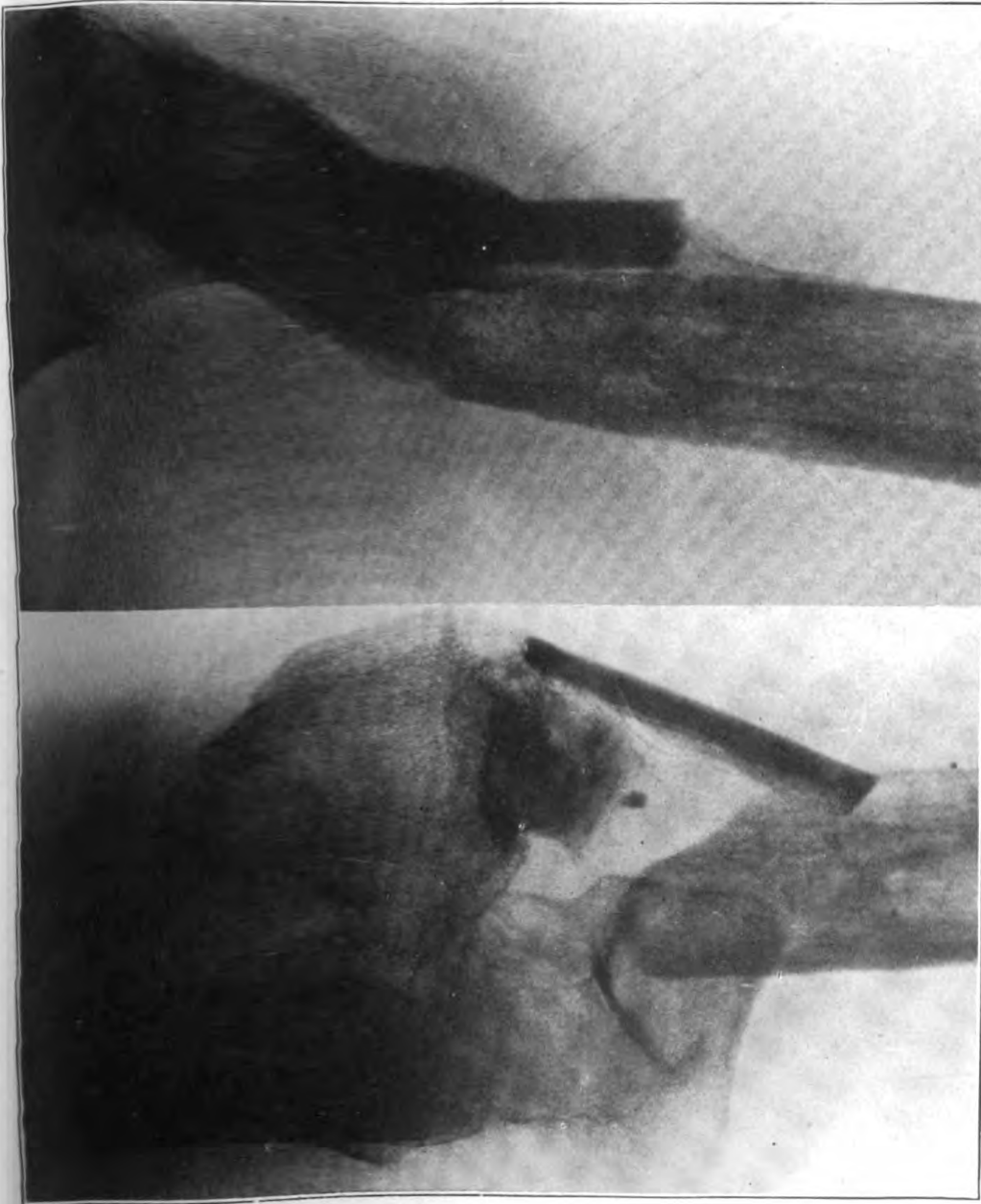


Case II after operation. Removal_of inner side of bone tunnel allowed muscle to collapse into and fill the cavity.
192-3



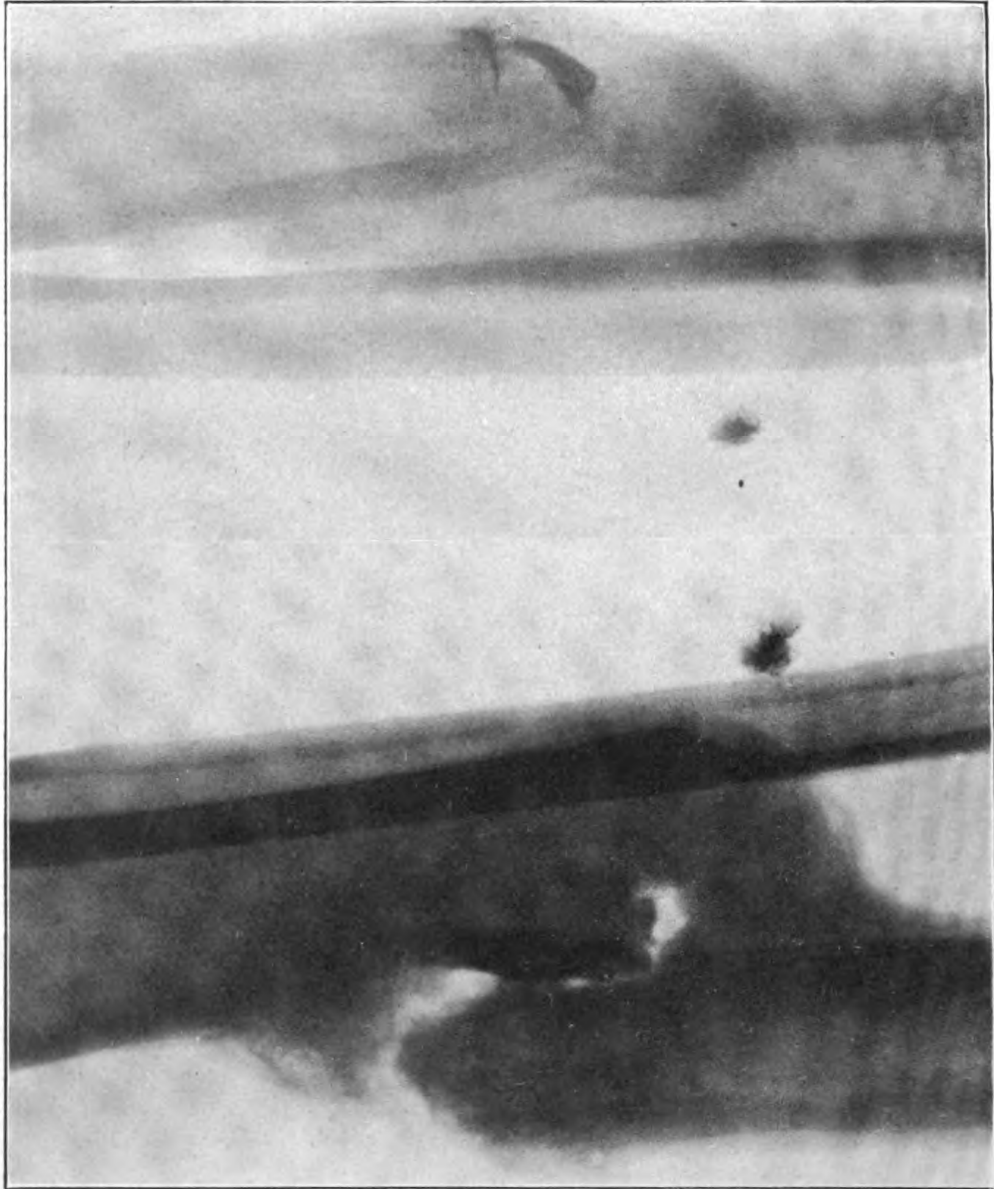
Machine-gun bullet wound involving the superior maxilla. Sinus opened under the malar bone. Suppuration for about eight months. Fragments removed. All necrotic bone curetted out. At the end of four weeks there is practically no purulent discharge.

192-4



Condyles of humerus laterally transposed by fragment of high-explosive shell. The graft, unavoidably, was perhaps too short. Lateral view demonstrates union.

192-5



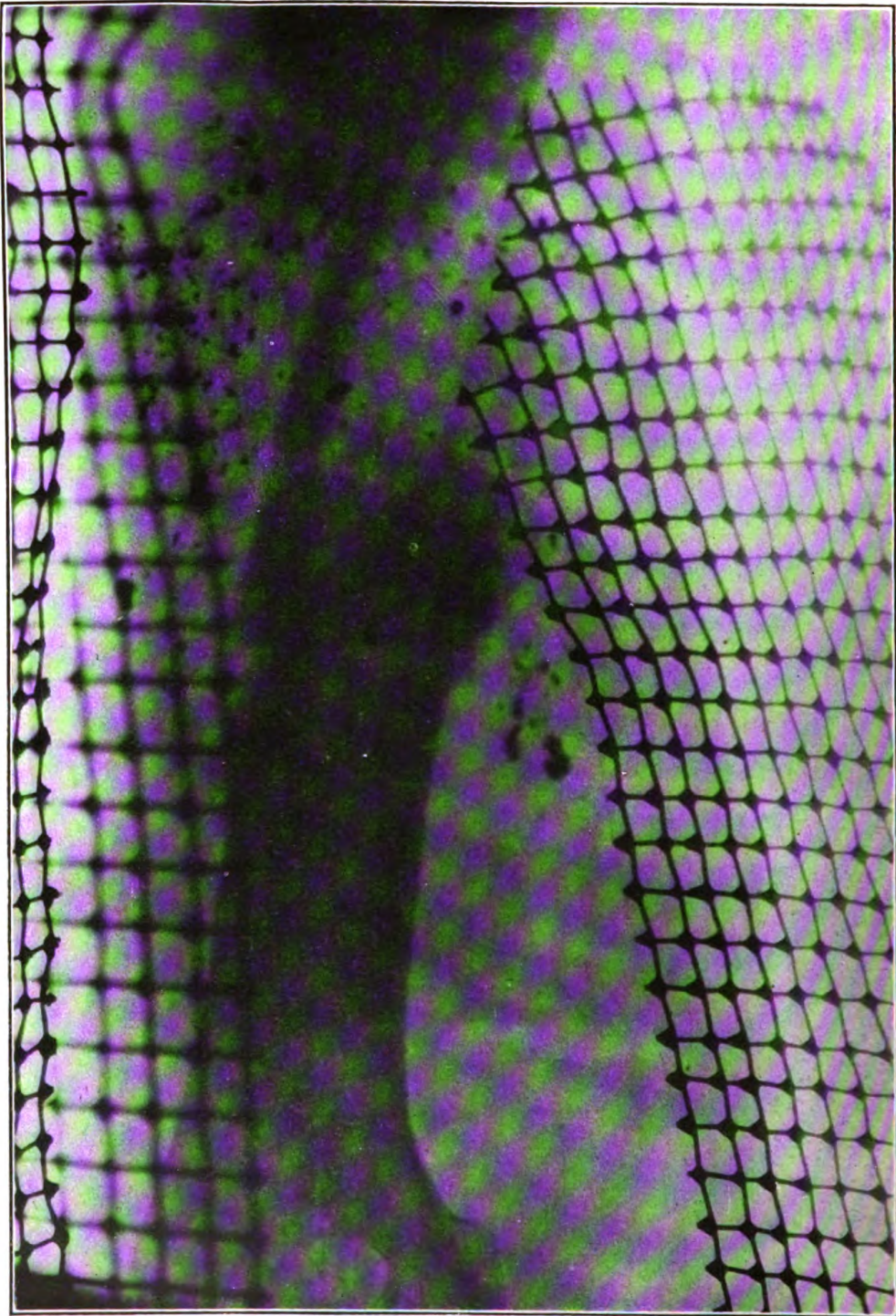
Compound fracture of tibia and fibula from aeroplane accident. The sinus leading to a tunnel in the shaft of tibia suppurated for six months.

192-6



Ununited compound fracture of humerus. Discharging sinus, outer side of arm. Simple curettage of the fragments stopped the suppuration.

192 7



Ununited compound fracture of humerus from machine-gun bullet. Tibial graft used as bone inlay.

192-8



Bone inlay, lateral aspect of tibia, for ununited fracture caused one year before by high-explosive shell injuring both long bones.

192-9

TIME FOR BONE GRAFT OPERATION.

So much has been written on this subject that there is little more to be said. It is probably not safe to operate before six months have elapsed. A good test is to have the part vigorously massaged for a week. If the infection does not light up, it is usually safe to operate. The two-stage operation is probably the best; that is, at the first operation clean up the scar tissue and the ends of the bones, and then wait 10 days or 2 weeks before proceeding with the inlay. Our cases have come to a point after waiting so long for the infection to subside that they are very anxious to get out of the hospital and want the entire operation completed at one time. The autogenous graft has been used in all fractures involving the leg or arm.

REPAIR OF NERVES INJURED IN CONJUNCTION WITH FRACTURES.

Our experience in this line has been confined mainly to the musculospiral nerve; no attempt has been made to repair the nerve if it lies in the infected area until after suppuration has subsided.

At the time of the inlay operation, if the nerve was in apposition to the bone, a sheath has been made of either fascia lata or fine cellular fat taken from over the fascia lata. In addition to this, the scar tissue has been removed and the fascial planes found and prepared in order to prevent scar tissue formation.

I am told by a surgeon who has done a large amount of nerve work that he has practically given up the use of transplants and now endeavors to find the normal planes in order to do away with scar tissue as much as possible.

No attempt has been made in this article to go into minute details of the treatment of infected compound fractures and only a few of the salient points have been presented with the idea that they might be of interest to those developing this branch of surgery.

DEATH FROM NOVARSENOBNZOL.¹

By R. A. TORRANCE, Lieutenant Commander, Medical Corps, United States Navy.

The patient, a third-class fireman, died within 12 hours of receiving 0.75 gram novarsenobenzol (Billon) intravenously. Previously, while on the U. S. S. *Galveston*, he had received 0.3 gram June 24, 1920, and 0.6 gram July 1, 1920, with no ill effects. Heart, lungs, and kidneys had been examined and appeared normal. The patient had a severe syphilitic infection, and at the time of the fatal medication active measures were called for by the numerous mucous patches in the mouth and around the anus.

¹ Extracted from official report forwarded to the Surgeon General, United States Navy, from the U. S. S. *Chattanooga*, Constantinople, Turkey, July 12, 1920.

The tube used in this case was carefully inspected by the hospital corpsman in preparing for the injection and again by the medical officer before opening. It was apparently perfect. The contents dissolved perfectly. The injection was made by the medical officer himself and, as he believes, with no error whatever in technique.

The medical officer whom I relieved had used this same preparation (Billon) intravenously 118 times without any ill effects. I personally have used this same preparation (Billon) 89 times on this ship without any ill effects. On the same day, from the same box of 10 tubes, with exactly the same dosage, two other men were injected intravenously with absolutely no reaction.

From an extensive experience with novarsenobenzol (Billon) I do not believe that this death should be charged to the account of the preparation, but should rather be ascribed to an idiosyncrasy for arsenic, owing perhaps to the slightly increased dosage, or else, and this is more probable, to the liberation, following injection, of an excessive amount of toxic material.¹

PRELIMINARY REPORT ON MERCUROCHROME-220, AS A GERMICIDE IN DENTISTRY.

By W. L. DARNALL, Lieutenant Commander, Dental Corps, United States Navy.

The following preliminary report based on the recent article of Young, White, and Schwartz is intended to show what has been done at the U. S. Naval Station, Mare Island, Calif., toward making it applicable to dentistry. Its high germicidal power coupled with its lack of irritating effect and its thorough penetration make it particularly suited to oral pathological conditions.

Mercurochrome-220 is a synthetic drug obtained by substituting one atom of mercury in a molecule of dibromofluorescein, a substance closely related to eosin. Although its therapeutic status is in an experimental stage, enough has been proved by its use in genito-urinary tract to warrant its receiving attention from a dental standpoint.

In gingivitis and stomatitis the treatment used was practically the same for both. The membrane is dried and protected by use of cotton rolls, and the area touched with a 3 per cent solution of mercurochrome. In infected sockets the socket is washed out with a strong antiseptic spray, all necrotic tissue removed, and the solution carried down into the socket with a small pledget of cotton.

In pyorrhea, after prophylaxis, the teeth are isolated with cotton rolls buccally and lingually, and the surface dried as much as possible.

¹ A tube of novarsenobenzol from the box which contained the tube used in this case has been forwarded to the Bureau of Medicine and Surgery for such laboratory examination as may be desired.

The solution is carried down into the pocket with a small wisp of cotton wrapped on a broach. Care should be taken to protect the crown of the tooth from staining.

In root resection, after curettement, the cavity is touched with a 3 per cent solution of mercurochrome.

In conductive anesthesia, just before injection, wipe off the area where the needle is to be inserted and touch with a 1 per cent solution of the drug.

In putrescent root canals it is our belief that this germicide will prove to be as efficient as any used in this branch. However, we can only record fair results so far, due to the inability to get a check on all our cases, the men being ordered away after a few weeks' training. On account of its staining properties care must be taken in its use. The crown is protected by running paraffin into the cavity and then opening up the canals with a small plugger. The canals are treated with a 5 per cent solution every other day until laboratory findings are negative. The drug is applied by use of cotton points carrying it well to the end.

Out of a large number of case histories the following have been selected:

Case 1: E. L. S., corporal, U. S. Marine Corps. Gingivitis acute. Teeth involved, 4 to 7. Routine treatment every third day. Healed in two weeks.

Case 2: J. W. J., trumpeter, U. S. Marine Corps. Gingivitis acute, involving lower third molar. Three treatments. Healing rapid.

Case 3: S. F. W., lieutenant commander (Medical Corps), U. S. Navy. Pyorrhea acute. Pocket around mesial root of upper second molar. Established drainage; four treatments of 3 per cent solution of mercurochrome. Ordered away; much improved when last seen.

Case 4: C. E. W., private, U. S. Marine Corps. Large necrotic area around lower first molar. Extracted, curettement. Treatment, 3 per cent mercurochrome. Healed rapidly.

Case 5: E. F. V., lieutenant commander, U. S. Navy. Putrescent canal; lower bicuspid treated with 5 per cent solution of drug. Laboratory findings—plus, plus, negative, negative, negative. Canal filled.

Case 6: R. F., private, U. S. Marine Corps. Granuloma around upper left lateral. Resected root. Large area of bone involved. Touched with 3 per cent solution of mercurochrome. Ordered away; healing rapidly when last seen.

In presenting this report attention is invited to the original report for chemical, therapeutic, and experimental data. It is only our intention to bring out its dental possibilities.

This drug is especially suited to the treatment of gingivitis and stomatitis. A 3 per cent solution was used with impunity in all open

lesions, no irritation resulting. The best results are obtained by drying off the part affected and applying the solution not oftener than every other day. Although it is rather disagreeable on account of its stain, it is hardly more objectionable than iodine and will not produced a permanent stain on the tissues. The stain may be removed from teeth by alcohol if used at once.

REFERENCES.

- (1) Young, H. H., White, E. C., and Swartz, E. O. A New Germicide for Use in the Genito-Urinary Tract, Mercurochrome-220. Jour. Am. Med. Assn., November 15, 1919.
- (2) Clapp, M. D., Martin, M. F. Use of Mercurochrome-220 as a Germicide in Ophthalmia Neonatorum. Jour. Am. Med. Assn., May 1, 1920.
- (3) Preliminary Report of Council on Pharmacy and Chemistry. Jour. Am. Med. Assn., January 3, 1920.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander Lucius W. Johnson, Medical Corps, United States Navy.
Lieutenant G. A. Gray, Medical Corps, United States Navy.
Lieutenant C. N. Meador, Medical Corps, United States Navy.
Lieutenant A. H. Ehrenclou, Medical Corps, United States Navy.

GENERAL MEDICINE.

BROWN, L. **Diagnosis and treatment of pulmonary tuberculosis.** Am. Jour. Med. Sc., September, 1920.

The diagnosis of pulmonary tuberculosis becomes more difficult as time goes on. This is not a paradox but a concrete epitome of the history of modern investigation of the disease. Time was when a cough and expectoration and a few fine râles, possibly above the clavicle, sufficed for a diagnosis. Gradually sputum examination, tuberculin, roentgenology, and complement fixation have become necessary factors in attempts at positive diagnosis.

In some cases it is impossible to affirm or deny the presence of tuberculosis, though failure to react to intradermic tuberculin is rare.

The term "nontuberculous" implies:

1. No occurrence of tubercle bacilli in sputum.
2. No persistence of moderately coarse râles in the upper chest.
3. No parenchymatous Roentgen-ray changes.
4. No history of hemoptysis.
5. No history of pleurisy with effusion.
6. Failure to react to a second subcutaneous dose of 10 mg. of Old Tuberculin.

In the absence of all but the latter (6) feature the case is designated "suspected tuberculosis." Where some of the data are not obtained and the others are distinctly negative the diagnosis is "tuberculosis unwarranted."

The one positive and pathognomonic sign is the presence of tubercle bacilli in the sputum. When but one or two bacilli are found this should be confirmed by two observers. When bacilli are unmistakably present they outweigh all negative features of the case. The

fact that tuberculosis may exist and bacilli not be found readily has led recently to some neglect of this diagnostic element. The search should be diligent and prolonged. Gastric and intestinal contents may reveal the bacillus when absent in the sputum.

Next to the bacillus the most important diagnostic point is the presence of râles. Various types are found, but the characteristic râle is the moderately coarse one depending for resonance or dullness on the amount of solidification of pulmonary tissue between bronchus or bronchiole and the chest wall. It may only be heard during the hurried inspiration following a cough. If no râle is heard after cough, have the patient exhale to half or full capacity, cough again and inhale. Essential to successful physical examination of the chest is the complete relaxation of all muscles. If coughing is too active, the râle may escape detection. Coarse râles in the upper chest, heard during quiet respiration, imply that the incipient stage is already passed. Physical signs most frequently appear first at the apices. The râles to be significant must be in the upper part of the lung and be constant on several examinations.

Pulmonary tuberculosis may exist without râles, and, indeed, with only the most indefinite physical signs, the general symptoms alone establishing the diagnosis. If the bacillus is not found in the sputum, râles heard only at the base of one or both lungs should not be considered due to pulmonary tuberculosis. With a right apical lesion typical râles may be heard on the left side in the outer fourth and fifth intercostal spaces. For some time symptoms may be indefinite and then suddenly râles appear in an unusual situation and spread quickly over the whole side.

Among the slighter signs to be carefully noted are: Distant breathing at the right apex; granular breathing of the type suggesting that fine râles are about to be heard or will appear with coughing (though they may not); prolonged expiration, possibly high pitched at right apex; high-pitched inspiration, with roughening or accentuation at left apex.

Roentgen-ray examination often gives more extensive information than the physical signs. The diagnostician should seize every opportunity to visit the radiographer and familiarize himself with his interpretation of plates. Often the radiograph will prove that so-called "incipient" cases are really moderately advanced. Physical examination only reaches the peripheral portion of the lungs and if this is not invaded such examination may be very misleading. There may be suspicious or suggestive signs from an apex while the Roentgen ray shows well-marked parenchymatous lesions more deeply seated. Again the Roentgen ray may reveal that the abnormalities found by physical examination are not due to tuberculosis but to some wholly different cause.

Hemoptysis is most significant when blood-streaked sputum follows for several days the bringing up of a drachm or more of blood. The stained sputum is suggestive, but occurs in acute bronchitis; frank hemoptysis occurs also in pulmonary abscess and less commonly in bronchiectasis.

Clinical data are more important than the complement-fixation test, but in a doubtful case of some fairly developed disease the repeated absence of a positive complement-fixation test is strongly suggestive of nontuberculous disease. Once having established the presence of pulmonary tuberculosis, the question arises—does the patient need treatment?

“In all we have given 324 patients the subcutaneous test. Of these, 10 have died of tuberculosis and 59 have relapsed in a period covering from 2 to 18 or 20 years. In other words, 25 per cent in whom we were not sure of a diagnosis relapsed and 4 per cent have died. Of the 42 patients who have failed to react to a second dose of 10 mg. of Old Tuberculin, 2 have relapsed and recovered and 2 have died, 1 from acute lobar pneumonia and 1 from a cause unknown.

“As I have come to learn what an amount of disease a chest may contain when the physical signs are equivocal, I wonder that some of these 282 patients were not permanently injured after sharp reactions; but, on the contrary, many felt better, and asked for this reason to be given tuberculin as a treatment. To-day we take no such chances, and if the Roentgen ray shows any parenchymatous changes they must be very indefinite or else very old and calcified. In our recent cases (numbering 30) we have had 4 only that showed a definite increase of clouding about the suspected areas, and in some of them râles occurred for the first time. To-day we send home at once a patient who fails to react to two doses of 10 mg. If he reacts and still shows no change by physical signs or Roentgen ray, we increase rapidly his exercise and send him home in a few weeks if he does well. None of the 42 has ever reapplied for admission, though we have always told them we would take them in at once if they relapsed.

“Only a small number of patients can be submitted to such tests, and for many the problem of whether the disease under consideration is active or inactive is not easily solved. We have made some study of it and have attempted to divide the symptoms in relation to activity into two groups: (1) Cardinal symptoms, including hemoptysis, pleurisy, fever, rapid pulse, lack of endurance, loss of weight, and night sweats, and (2) subsidiary symptoms, including chills, cough, and expectoration. In our studies we have not considered the presence of tubercle bacilli in the sputum as evidence of clinical activity, though we realize that such patients are much more likely to relapse. We have arbitrarily chosen a temperature of 99 F. in the

male adult and 99.5 F. in the female and a pulse rate of 90 in a male and 96 in the female as the upper limits in nonactive cases. Of course, other disturbing factors must be excluded. We studied 198 patients in regard to relapse and found that 90 per cent of the relapsed had a positive complement-fixation test and that 70 per cent had been considered 'clinically active,' while of those who did not relapse 50 per cent had a positive complement-fixation test and 75 per cent were 'clinically active.' The presence of râles was not of much help, and even when they occurred, with tubercle bacilli in the sputum, only 50 per cent were considered clinically active. The whole subject is very intricate and needs further study, as you can readily see from these figures.

"To summarize briefly, I feel that fever, rapid pulse, lack of endurance, loss of weight and night sweats suggest tuberculosis, which must be excluded if possible. If to these we add cough and expectoration, which have persisted for several weeks, we must focus our attention for a time on the lungs. But if we can find no more evidence than the symptoms I have just mentioned, I do not feel that we can make an absolute diagnosis of pulmonary tuberculosis. To do so, one or more of the six diagnostic essentials that I stated in a negative way a few minutes ago must be present. I refer to tubercle bacilli in the sputum (confirmed on two examinations); persistent moderately coarse râles in the upper chest; a parenchymatous Roentgen-ray lesion, more weighty if in the upper chest; a history of frank hemoptysis, of pleurisy, and a positive complement-fixation test."

Treatment is difficult and calls for courage and a sanguine temperament in the medical adviser. Do not temporize when the diagnosis is made, but tell the patient frankly. It gives him a shock, but the shock is useful in the long run. The many difficulties in the way of a cure should not be overemphasized at first. The initial period of treatment is a "danger time" requiring great judgment on the physician's part.

"I know of no way more certain to avoid these dangers than to keep your patient in bed on a porch or in a room with wide-open windows until his education has progressed to a point that you feel you can trust him not to overdo. * * *

"In recent years I have come to regard rest as the most important point in the treatment of pulmonary tuberculosis. It is far better for a patient to be in bed in a room with fair ventilation for several weeks than to dress and to walk some blocks to a park where he can sit out for several hours and climb several flights of stairs to regain his room. If you can persuade your patient to do this, seize upon the opportunity to educate him. Put such literature in his hands as he can comprehend and encourage him to write down questions. Tell

him frankly that your visits are as important educationally as medically. If you can get him to think out his problem, three-fourths of the battle is won. I usually try to keep my afebrile patients in bed six weeks. Patients with fever demand much longer periods of rest.

"Exercise at the proper time is as important as rest, but even then vastly more dangerous. The scar, of course, at the end of six weeks is not densely fibrous and requires careful stretching, such as is exerted by gentle breathing. I do not refer to respiratory exercises, which I seldom use. To reeducate the patient physically requires that the physician should become a physical trainer, who never forgets that he is dealing with a damaged organ that demands far more rest than a normal organ. This, too, must be impressed upon the patient. I sometimes put it that they can play and get well or work and get well, but they can not work and play and get well. To watch the effect of any new form of exercise, have your patients take it every other day. It has seemed to me that afebrile patients kept in bed six weeks could be given exercise rather quickly. I frequently allow them to take, after they are accustomed to dressing, to going to meals, and to climbing the necessary flight of stairs, one-quarter of an hour's slow walking twice a day the first week, one-half the second, three-quarters the third, and one hour the fourth, provided, of course, there has been no increase of symptoms. After that if I feel that I can trust the patient I put him on unlimited exercise and tell him never to get out of breath or to get tired. Of course, many patients do not advance thus rapidly, and remain at 15 to 30 minutes twice daily for some weeks. Such treatment as I have just outlined is applicable only to early and favorable cases. * * *

"Food requirements in pulmonary tuberculosis have undergone considerable change. At first the patient was overfed and now we realize that food has a specific object in this treatment and should be prescribed accordingly. The struggle against pulmonary tuberculosis is a fight to strengthen and to build up the recuperative powers within the individual patients. Scar tissue must be formed. Calcium salts must be deposited. The increased wear and tear of fever, which increases the caloric output of the body by 50 per cent, must be combated. At the same time such patients crave little food. The old idea was that patients needed much meat and milk. It is of interest to note that when, after the war, an attempt was made to put flesh on some Germans by greatly increasing their fats and carbohydrates it could not be done until an excess of meat was added to the diet. It seems that extra meat is necessary until the patient has a proper amount of protein in his body. If excess of calcium salts are necessary, no food furnishes such an amount of this dietary essential as milk, combined, too, probably in such a way that it can be used at

once by the body. The fact that the calcium content of the blood serum does not vary in pulmonary tuberculosis is no argument in my mind against its use. One may recall that the same argument was used against the use of iron salts in anemia. * * * With a judicious use of milk there is no call for any anxiety about a lack of fat-soluble in the diet of our patients, but it is of interest to note that cod-liver oil and butter fats contain it in large quantities, while all vegetable oils and fats are deficient in it or lack it entirely. The water-soluble B is practically always supplied in sufficient quantities." (J. S. T.)

Symposium on the clinical recognition of syphilis. Am. Jour. of Syphilis, Vol. IV, No. 3, July, 1920.

I. GRAVES, W. W. Principles in the clinical recognition of syphilis.

So manifold are the manifestations of syphilis and so widespread is its distribution among civilized races of man that the physician is compelled to consider the possibility of syphilis either as a causative or complicating factor in almost every individual who presents himself for diagnosis and treatment. The physician in his work must constantly ask himself these questions:

1. Is the individual a syphilitic?
2. Is the disease picture presented by the individual that of syphilis?
3. Is the disease picture presented by the individual complicated by syphilis?

Each of these questions must frequently arise in the physician's mind in his daily contact with the sick, but not one of them, excepting the first, can usually be answered by the laboratory alone. All of them can be answered in most cases by the study of the whole individual in all this phrase implies, and then, and not until then, should the aid of the laboratory be sought and utilized in diagnosis.

II. GRINDON, J. The initial lesion and its differentiation from other lesions.

Down to our own day the recognition of syphilis rested upon clinical evidence alone, and while the diagnostic frontier was gradually pushed further and further, such extension could only result from the correlation of clinical conclusions, depending in turn upon the gradual accumulation of observed facts. Progress was necessarily slow, and doctrines elevated to the rank of dogma were proportionately secure from attack. Now, however, that microscopy, and especially serology, have come to our aid, new territory is daily being added to the domain of King Lues, while none but a Bourbon among clinicians would maintain that his conception of the symptomatology of syphilis had attained finality.

A typical chancre is probably more "true to form" than any other lesion; it wears a characteristic physiognomy. The true chancre is usually single, but multiple in possibly 20 per cent. The period is roughly 3 weeks, the average 25 days, and the extremes 15 and 45 days.¹ A reddened, itchy spot presents a rapidly excoriating center, soon covered by a light crust. Little by little the lesion extends at its periphery, and soon becomes a round or oval, sharply defined, superficial, flat erosion, level with the surrounding surface or rather elevated than depressed. Its borders are regular. There is slight tenderness, but, in most situations, no pain. The lesion then becomes a papule. Grasping it between the thumb and finger one detects an intradermal infiltration. This induration is rarely absent, but may vary greatly in degree. The chancre heals in about a month. Induration usually appears during the second week. It persists after healing, but has usually disappeared by the end of the second month. In the majority of cases, there being no deep destruction, chancres heal without permanent scar. In ulcerating cases there remains a depressed cicatrix, at first pigmented, later blanched.

The adenopathy of primary syphilis is characteristic both in its appearance and in its course. The nodes are enlarged, but remain discrete and mobile with little or no tenderness. The enlarged nodes are bilateral but best marked on the side of the chancre. The phenomenon becomes apparent at about the end of the first week. Resolution is slowly progressive and rarely complete.

More than 6 per cent of chancres are extragenital. When the sore is on the upper lip, we must look for the node under the jaw; when on the lower lip it will be under the chin. Tongue chancres are accompanied by submaxillary adenopathy. Tonsillar chancres are usually at first mistaken for diphtheria. They remain unilateral, show a characteristic induration and lymphatic swelling near the cornu of the hyoid on the same side. Chancres of the trunk are found mainly in three situations, the suprapubic region, the anus and perineum, and the female breast.

III. ENGMAN, M. F. Early and late skin and mucous membrane reactions.

Probably within 10 days after the initial inoculation, the virus of syphilis becomes generally distributed to the various tissues of the body and antedates the objective appearance of the chancre by one or two weeks. Subjective symptoms may occur during this time, but the localization at points of distribution in the skin is not usually observed for from 60 to 100 days after the initial inoculation. The earliest seen is the syphilitic roseola, which is usually accompanied by constitutional symptoms. These red spots may disappear or may

¹ Many writers give 10 to 90 days as the limit.—EDITOR.

develop into the characteristic lesion of syphilis, the papule, which is the culminating lesion and completes the cycle of the spirochete in the tissues.

In the early stages of the disease there are certain characteristic and diagnostic appearances which are common to all of the cutaneous manifestations, due to the location of the lesions and the peculiar distribution through the terminal vessels. The color is usually described as a coppery or raw ham tint. The lesions have a tendency to be disposed in circles or segments of circles, due to the distribution of the emboli in the terminal arterioles and capillaries. The lesions come in crops, one crop following closely upon another, and they are therefore seen in various stages. All syphilitic lesions, with the exception of the early macule, are hard and infiltrated, since they are new cell formations or granulomata situated in the derma. They extend at the border in a serpiginous manner. Pain and itching are rare.

IV. HORWITZ, A. E. The reactions of bones and joints.

In syphilis, as in any other disease, a diagnosis can and must be made by clinical signs and findings. Especially is this true in bone and joint syphilis, in which the laboratory findings are notoriously unreliable. In bone lesions of undisputed luetic origin the Wassermann reaction is confirmatory in less than 50 per cent.

Syphilis of the bones and joints may be divided into three classes: Congenital, late hereditary, and acquired. Under the congenital are included all cases where any signs of syphilis are noted at birth or during the first year of life. Late hereditary cases are those where the symptoms appear between 7 and 12 years of age. In the acquired lesions primary synovitis is frequent with marked distention of joint capsule, fluctuation and riding patella, slight tenderness, absence of disability, slight or no limitation of motion, slight pain, and no muscle spasm. The important observation here is disproportion of joint distention to the pain and disability. The synovitis may be permanent or recurring.

Primary arthritis is rare. It is usually an extension of the shaft process into the joint. Symptoms noted are: Bone thickening, synovial thickening and infiltration, marked tenderness, slight muscle spasm, moderate disability, partial limitation of motion, bone absorption, abscess. The favorite sites are the knee, spine, and elbow. Osteomyelitis begins as an osteitis, extending to the medulla. The symptoms are those of ordinary osteomyelitis but the proliferation of new bone is more extensive. The destructive process is slow, by direct extension and frequently limited to a small area. Pain is pronounced, abscess is frequent. Onset is never acute and there is seldom a history of trauma.

V. SAUER, W. E. Reactions of the ear, nose, and throat.

Primary syphilis of the ear may occur in the auricle or meatus as a result of the use of infected towels and from bites. Luetic involvement of the internal ear is not infrequent, usually occurring in the late secondary or early tertiary stages. The characteristic most to be emphasized is the suddenness of the deafness accompanied by tinnitus, vertigo, and loss of equilibrium. Sudden deafness, particularly in the adolescent, especially in the nonsuppurative ear, is usually syphilitic. The new labyrinth tests are of value in the early diagnosis of syphilis. If a patient presents a suspicious initial lesion and the ear test on the eighth or tenth day shows a nystagmus after turning, of 18 seconds instead of the normal 26 seconds, syphilis may be suspected. If, after 3 or 4 days more the nystagmus lasts only 12 to 10 seconds, the diagnosis of syphilis is strongly suggested. These ear tests are also a help in estimating the efficiency of the treatment in cerebro-spinal syphilis. Salvarsan treatment is contraindicated in all cases of syphilis where there is any eighth nerve involvement, owing to the toxic action of the arsenic.

Primary lesions of the nose are rare. A number have been reported which resulted from improperly sterilized instruments. Secondary lesions are frequent but usually overlooked. The earliest manifestation is the syphilitic catarrh which may occur alone or with pharyngitis or laryngitis. This coryza differs little from an ordinary cold. Tertiary lesions of the nose are common, occurring in about 4 per cent of cases and from 1 to 30 years after the original infection. All perforations of the palate which are not traumatic; all ulcers, especially deep ones with punched-out edges and yellowish exudate; all cicatrices not otherwise accounted for, are usually syphilitic.

VI. HARDY, W. F. Reactions of the ocular apparatus.

A syphilitic individual may suffer with any disease of the eye, which may be in no wise etiologically related to lues. On the other hand, syphilis may be excluded from consideration because of negative physical or laboratory findings when in reality it is the causative agent.

Ocular syphilis is represented by paralysis of the ocular nerves in 18 per cent of the cases. The third, sixth, fourth, seventh, and fifth are affected in the order named, as regards frequency. Ptosis and isolated paralyses are often, but not always, due to syphilis. The immobility of the pupil to the light reflex can precede a meta-syphilitic disease for several years and can be the only sign of syphilitic infection during that time. The most typical cases of syphilitic iritis are those contemporaneous with the secondaries and

the nodules noted on the iris may be compared to papules or condylomata. The majority of cases of iritis occur within one year of infection. About 24 per cent of all cases of optic neuritis are due to syphilis. Syphilis is now more disseminated than ever before and the optic nerve and retinochoroidal lesions are alarmingly frequent. This is attributed to an increased virulence of the spirochete due to its rapid passage through many individuals.

VII. SMITH, E. S. Reaction of the cardiovascular apparatus.

Postmortem examination of 200 luetic subjects shows that syphilis is the most important cause of cardiac disease (endocarditis and myocarditis). The laboratory diagnosis of lues is not to be depended on, solely, by the physician; especially the negative evidence is not by any means infallible. Lues is held to be the cause of aortitis in practically all cases. A thoracic aneurysm means syphilis 8 to 20 years previously. While the clinician would not have a case of rheumatic fever under observation without careful, daily search for heart damage, the same clinician will probably assume the care of a case of syphilis without the possibility of the circulatory system being involved in secondary lues ever occurring to him. Lues is a frequent cause of general arteriosclerosis, especially in subjects under 40.

Throughout the whole symposium runs the thought that the laboratory diagnosis is not reliable and we are still dependent on clinical evidences for the diagnosis of syphilis. The tendency to follow blindly the laboratory reports without careful examination of the patient himself is deplored by all. (L. W. J.)

BOSTRON, C. H. Mercury bichloride intravenously. *Am. Jour. Med. Sc.*, Vol. CLX, No. 1, July, 1920.

This form of treatment has been used by various writers in different parts of the world in the last four or five years. The technique consists of dissolving mercury bichloride in normal salt solution in the proportion of 1 grain of mercury bichloride to 10 c. c. of salt solution, which should be kept in glass-stoppered bottles or may be placed in ampoules of 1 to 5 c. c.

Treatment is begun with 1 c. c. (which contains $\frac{1}{10}$ grain of mercury bichloride) intravenously, and increasing to π or $\frac{2}{10}$ grain on second dose, $\frac{2}{10}$ to $\frac{1}{4}$ grain on third dose, and $\frac{3}{10}$ grain on the fourth dose, at the rate of three doses a week. In the case of a strong man dosage can thus be gradually increased to $\frac{1}{2}$ grain. As soon as saturation appears, the maximum dose is considered as reached and treatments are reduced to once or twice a week. Treatment is continued for six weeks or as long as the Wassermann reaction is positive.

It is believed that tolerance for the drug is increased after salivation has cleared up. The advantages claimed are quicker results, more accurate grading of dosage, a better opportunity to observe the course of the disease, and frequent opportunity to obtain blood for Wassermann reactions.

The treatment is safe, painless and free from immediate or late alarming reactions, if simple precautions are taken. These are to insure prevention of a localized thrombus by avoiding damage to the wall of the vein during injection, and by using concentrated solutions.

In the test tube, bichloride of mercury with blood serum, forms a noncorrosive albuminate. This is presumably harmless because it is found in the circulating blood for several days after a single injection. Commonly the kidney suffers most in mercury poisoning, but no cases of kidney lesion had been observed that could be attributed to the effects of mercury bichloride, and many cases of mild nephritis, pyelitis, and cystitis existing along with the syphilis cleared up. (A. H. E.)

LEVIN, A. J. **Observations in transduodenal lavage and the usefulness of the Jutte tube.** South. Med. Jour., Vol. XIII, No. 7, July, 1920, page 490.

Use of the Jutte tube in obtaining duodenal contents for examination and study and in performing fractional gastric analysis, duodenal intubation for feeding and gastric lavage is advocated by the author. He deplores the fact that the doctor so frequently contents himself by inquiring if the bowels move regularly, neglecting to submit a specimen for thorough laboratory investigation at the hands of an expert in this particular line of research. In intestinal intoxications he holds that very often the purgative method of treatment is worthless. He therefore tries to "flush the intestines from above," especially in intestinal auto-intoxication. "To wash clean such a long, filthy convoluted tube as the small intestines we must use a large quantity of fluid and it must be nonabsorbable."

He does not hold that transduodenal lavage is a "cure-all," but he has found it of decided use in infections of the biliary tract in that it tends to produce better drainage in intestinal auto-intoxications, intestinal stasis, constipation, intestinal parasitic diseases, including amebiasis, selected groups of typhoid cases in the early stage (using nonpurgative fluids), summer diarrhea in children (introducing tube through the nose), and post-operative ileus.

The assumption that the same results could probably be obtained if the solution were given by mouth or introduced into the stomach is denied by the author's following statement: "Common sense would dictate that it is impossible to retain in the stomach 1,000 or

1,200 c. c. of such a nauseating fluid as is the original Jutte solution. If a small quantity of that fluid is regurgitated from the duodenum into the stomach patients do vomit; so the best way of introducing it is direct into the duodenum through the Jutte tube." (G. A. G.)

SIDBURY, J. B. **Active immunization against diphtheria.** South. Med. Jour., Vol. XIII, No. 7, July, 1920, page 474.

"The fact that diphtheria makes its appearance every year should make us realize that it constitutes a very important hygienic problem. In spite of these two remedial agencies (antitoxin and intubation set) the morbidity and mortality from diphtheria have remained about the same for the past 15 or 20 years. It seems very evident that if we expect to reduce materially our death rate from diphtheria we must seek other means than have been at our disposal or than have been generally used. Thanks to Schick, Von Behring, and Park there has been developed an efficient weapon against diphtheria, which is simple enough for general use and which seems to be as reliable as any other known medical remedy. This is the Schick test, combined with the administration of toxin-antitoxin to the non-immunes. If this was generally and intelligently used in our opinion over 95 per cent of diphtheria could be eliminated from this country.

"The reliability of the Schick test is best illustrated in the fact that of 1,000 patients sick with scarlet fever at the Willard Parker Hospital who had shown a negative Schick on admission not one developed clinical diphtheria, although no antitoxin had been given, and about 15 to 20 per cent of these children showed virulent diphtheria bacilli in throat cultures at the same time during their stay in the hospital. Since its use in the Hebrew Infant Asylum, New York City (four years), Dr. Alfred Hess says that not one case of diphtheria has developed in the hospital and that they no longer have a diphtheria ward.

"The Schick test has made it possible to distinguish definitely between 'clinical diphtheria' and 'carriers.' It has offered an explanation of why some cases of so-called diphtheria do so well without antitoxin while other cases, apparently identical, do so badly in spite of having had antitoxin. If the Schick test is used in these as well as in other cases, a great saving will be made in that antitoxin will not be given unnecessarily, and carriers can be identified by a positive throat culture and a negative Schick.

"It has been shown that antitoxin begins to develop in two or three weeks after injection of toxin-antitoxin and that the per cent of negative Schicks increases very rapidly after the third week. The reactions from the injections (toxin-antitoxin) are very slight,

if any. The younger the child the less likely is any reaction. As a whole, the reaction (in adults) from the toxin-antitoxin is much less than that experienced from the typhoid inoculation. It is one test (the Schick test) that is 100 per cent accurate."

The author describes the test and reports his work with the Wilmington (N. C.) Board of Health and the Board of Education. His tables are convincing and his method of educating the public to submit to the test, as described in his paper, is thorough and efficient. (G. A. G.)

BORELLI, L. The importance of buccal auscultation in connection with artificial pneumothorax. *Polliclinico*, Rome. XXVII, 30, July 26, 1920.

The systematic use of oral or buccal auscultation, proposed by Galvagni in 1875, is too much neglected in the physical examination of the respiratory apparatus. Though occasionally referred to by some authors, this method has not received the attention it deserves in the textbooks.

Oral or buccal auscultation is accomplished by holding the receiver of the stethoscope before the patient's open mouth while he breathes deeply and noiselessly through the mouth. It is particularly in cases of pulmonary tuberculosis that this method permits one to detect very fine râles due to bubbling during inspiration or expiration or both, and they are often heard with such distinctness and intensity as to suggest they have their seat in the trachea. The râles thus heard resemble the râles discoverable by auscultation over the chest wall as regards their relation to inspiration and expiration and the grouping of the bubbles. But in listening through the mouth the individual râles are more distinct one from another, they are higher in pitch and very clear, being reinforced by the vault of pharynx and mouth. The important fact is that râles may be heard by this method that are inaudible when sought in the usual way and it is even claimed that incipient tuberculosis is sometimes detected by oral auscultation.

The point emphasized by the author is the evidence furnished by oral auscultation relative to positive or negative pressure when artificial pneumothorax is being used therapeutically. When the pressure dropped to -1 or -2 the râles listened for through the mouth become audible, showing that pulmonary respiration was increased. On the other hand, as soon as the pressure was $+1$ or $+2$ the buccal râles disappeared. Moreover the patient if warned to pay attention will himself observe the phenomenon and be able to give notice when pressure should be increased.

The method of oral auscultation therefore furnishes an immediate valuable indication for the regulation of artificial pneumothorax. (J. S. T.)

MENTAL AND NERVOUS DISEASES.

WHITE, W. A. Simulation malingering not an adequate diagnosis. *Jour. Nerv. and Ment. Dis.* Vol. 50, No. 3, September, 1919.

Two opposite views are held concerning simulation—one by the laity, lawyers, and newspaper reporters, and the other by psychiatrists, criminologists, and students of human behavior. The one view regards simulation as a common way of escaping the consequences of one's acts, the other as an unusual phenomenon, itself the expression of a defective personality. The word simulation covers that group of symptoms the assumption of which by the patient serves his particular purpose—mayhap the avoidance of disagreeable duty or punishment. The diagnosis is usually made when such symptoms seem to be present and when by some form of deception the patient is trapped into showing by word or act that the symptom is assumed and that the supposed disease does not exist. Present-day psychiatry no longer warrants such an attitude. The mere fact that such a symptom is of some benefit to the patient is no indication that it is assumed. This is the general function of symptoms elsewhere in the field of medicine, and they are not usually thought of as assumed.

In psychological events we have come to look for causal relations, as elsewhere in the body and, here as there, symptoms appear because of their expectant benefit to the individual, "Man's activity as directed by his psyche invariably has his benefits as ends." Consciously or unconsciously, the results of a course of conduct must be conceived of as being wished for by the individual. Many examples of varying degrees of subtlety are seen daily. The languishing and interesting hysteric craving much attention, the neurotic with a paralytic and anesthetic extremity as a punishment for sins, or the introverted who avoids all life's responsibilities by regression to an infantile personality, or the grandiosity of the paretic as compensation for organic defect are readily recognized examples. It is not a definite conclusion that a patient is malingering when trapped into the use, reflexly, of a supposedly paralyzed member. This proves the paralysis is not organic and therefore it is psychological, due to hysteria, "but hysteria is admittedly a psychosis and hysterical paralysis admittedly psychogenic." This was already known, however, but as to the nature of the motive and as to the consciousness or unconsciousness of it we are not enlightened.

Recent developments in psychiatry and in psychology indicate that such symptoms as these are "motivated in the unconscious," and in the ordinary meaning of the term the individual is not responsible for them. It is only when the motive can be shown to arise "in the field of the clear conscious awareness of the individual

who at the same time had the conscious purpose in mind " to bring about some " individually desired and consciously appreciated end by means of deception " that the term simulation (or in this sense of a conscious act, malingering) might be applied and have real meaning. This restricted sense which undoubtedly is the sense of its ordinary practical application—less clearly differentiated—has been made possible only by the concept in psychology of the unconscious.

A diagnosis should not be made in this instance on a single symptom any more than elsewhere in medicine, and malingering or simulation is only one symptom. The assumption of a symptom of any kind is the individual's way of responding to a problem in reality. The inadequate response of a defective physiology to infection spells doom for the individual. The response of a defective mental make-up to ordinary stress of life is frequently a psychosis. Certain individuals develop psychotic episodes when passing through various physiological epochs that are usually experienced by the average person without upset—parturition for instance. These are defective and inadequate reactions because they do not enable the individual to deal with the reality situations efficiently and constructively. So it is with simulation. It is an inadequate, inefficient way of dealing with a reality. This seems true in children in whom we expect certain departures from accepted standards. If a child sulks or complains of not feeling well when asked to do something against its will we are inclined to understand and excuse such conduct. The analogy to similar conduct in an adult is very close. In an adult it is an infantile type of reaction and we should recognize the personality behind it as poorly organized, defective, and to that extent inadequate and inefficient in dealing with real situations. Lying, alcoholism, hysterical palsies are the efforts of a defective type of personality to meet every-day fact. The selecting of any one prominent symptom is not making an adequate diagnosis of that individual's condition. The reaction of simulation is in itself an indication of a defective personality.

It can be concluded that a symptom the motive for which may arise in the field of clear conscious awareness as the expression of a clearly conscious purpose to deceive may not always be solely classified as simulated. A further question arises in regard to the nature of the motive back of this reaction. It is frequently a psychotic motive. There are cases which appear to have fulfilled the conditions of a clear conscious invention of symptoms in order to deceive, but which on examination prove otherwise. Prisoners have confessed that they feigned insanity to get out of prison into a more pleasant hospital, but examination has shown they were suffering from a psychosis when transferred, or were convalescent, or were then

psychotic. This reaction has a twofold object; to save themselves from a realization of having suffered from mental disease, and also, in the nature of an overcompensation to demonstrate their ability, in deceiving the prison officials. Many such have little realization of what they have been through and so can hardly be credited with a conscious effort to deceive. It is a pure defense reaction.

Simulation can not be diagnosed therefore "upon the utility of symptoms for all symptoms are useful," nor upon the motive, for it may be psychotic or at least indicative of a defective type of personality. The difference between the layman's view of simulation and that of the scientist is explained by the function of hate or herd condemnation. This destroys that which is useless and detrimental, to reconstruct along better lines for the good of society. In the layman's view, punishment should be the natural consequence of simulation. The scientific view raises the problem to a higher plain and sees deeper into the phenomena. The purpose of herd condemnation is twofold, first to repress, and second to direct and sublimate the expression of the instinct to higher and socially accepted levels.

The simulator should not necessarily escape punishment—but this should be devised both as to kind and degree so that its sole purpose would be to change the type of reaction from a destructive, socially unacceptable form to a constructive socially acceptable one. To do this there should be no element of hate in the attitude of those charged with this duty, but only that of attaining best results by the best means for both society and the individual. The best form of such treatment can only be learned from a thorough understanding of the individual. It is both absurd and vicious to hold a defective as responsible as a normal person. The condition is only made worse and society is not benefited. But proper guidance, perhaps, by some form of punishment, applied not in a spirit of hate but with a judicial attitude throughout the whole procedure, may develop the better part of the character make-up of these types. This can be the only way proper justice can result and not be an arbitrary attempt to make the punishment fit the crime. Punishment with the motive of hate back of it should disappear, and in its place substituted a method already mapped out for us by the physiologist Pavlov—a method of using stimuli to condition conduct. Simple condemnation though helpful to the race does not help the individual and should be replaced by sympathetic understanding—also helpful to the race by raising the whole problem to a high level.

"The diagnosis 'malingerer' is a formulation of the herd critique which calls for punishment (i. e., a form of retribution reaction)." This is a useful reaction, but we have better ways of dealing with the group of phenomena included in the concept "simulation." The

motive and the mechanism expressed in the patient's behavior, the understanding of what the patient is trying to accomplish by means of the psychosis, is more important than making a diagnosis by name. (A. H. E.)

WHITE, W. A. *Extending the field of conscious control.* Psychoanalytic Rev., Vol. VII, No. 2.

This delightful paper almost defies review because every sentence is pregnant with meaning and interlocks with the one before it and after it in an argument for the study of motive, for the careful analysis of the underlying causes of special manifestations of disease, for an increased understanding of the influence of environment on conduct. The damaging effects upon conduct of unrecognized factors in environment and occupation, and of wishes which distort judgment, are pointed out. As the dominating place in nature occupied by the higher animals is ascribable in part to the gradual perfecting of the sense organs thus increasing capacity for an appreciation of environment; as scientific progress has been achieved in a measure through the elaboration of instruments of precision like the microscope, spectroscope, etc., which permit accurate observation of man's surroundings, so mental hygiene aims to perfect the mind in order that it may function more accurately in regard to the individual's environment. Man's reaction in a given situation is not determined wholly by the conditions then existing but by the sum total also of his previous experiences, many of which act upon him without his consciousness of them. Our thoughts and our actions are in part the result of many unrecognized tendencies and hence often in opposition to our best present interests.

Hitherto the gradually increasing extension of our power to bring instinct under the domination of intelligence has been incidental and unconscious. When this was undertaken in the past it was usually for an ulterior purpose. Acts of violence or injustice were forsworn because they interfered with the achievement of eminence or power. To-day we must thoroughly understand and appreciate the latent impulse so that it may be consciously and deliberately mastered. In the field of medicine may be mentioned the disastrous result of certain repressions which are analogous to friction in a machine with consequent wear and tear on its constituent parts. Education must be an unfolding and not a repressing process.

(J. S. T.)

PATRICK, H. T. *The patient himself.* Jour. Am. Med. Assn., January 10, 1920.

Medicine is now practiced by the machinery of set methods. Little thought is given to the patient, the man, the woman, or child. In-

dividuals are liked or disliked according to certain of their personal qualities, such as sensibleness, kindness, selfishness, irritability, or pessimism. These are mental, not physical qualities; attitude depends on personality. Attitude is more important to him and to society than his organs. Personality is the sum of all his tendencies, experiences, desires and aversions, hates and passions, inhibitions and appetites, reflections and knowledge. The tendencies are few and simple, the experiences myriad, mostly in the form of conflicts. From the beginning life is a conflict, an effort to live and be happy, an effort to adapt ourselves to the conditions under which we must live. It is a struggle between what we consciously or unconsciously wish to do and what the present state of society requires us to do; it begins in infancy and ends in the grave, and as we grow older these conflicts become more complex and more acute.

Some persons are successful and well, others unsuccessful and ill or unhappy. Conflicts are ever present; it is easy to see there must be many defeats. Now and then one comes out a thief, a tramp, an invalid. One does not think of petty larceny, constipation, and eye-strain in the same terms, but they may be equally due to social inadaptability. Each is the reaction to a difficult situation.

The whole question of health is one of adaptation. We have typhoid because individually we are still vulnerable to the typhoid germ, or because as a community we have still failed to combat it. Some have a neurosis because they still are unable to harmonize with their environment—and for no other reason. Social inadequacy starts a multiplicity of symptoms which the patient expects the physician to relieve. To speak of the hyperacidity of financial insufficiency, the dysmenorrhea of domestic inharmony, and the tachycardia of industrial futility may sound incongruous, but sometimes that is what they are.

A war neurosis is a good example. War and trenches are disagreeable, but our practices do not allow running away. A neurosis is no fun, but it is better than the trenches. If one has lost an arm or a leg a neurosis is unnecessary, for one then does not have to endure the trenches.

Peace neuroses are just the same—a more or less unconscious way around a difficult situation. Perhaps the patient could handle it, but he prefers to go around. For our patients the way around is often insomnia, a nervous breakdown, backache, asthenopia, indigestion, headache, exhaustion, palpitations, and many other things for which medicines are given and operations performed.

A neurosis is a defense reaction in which to hide from a trouble—a conflict that a normal person would compromise satisfactorily. Everyone has sex problems these days and they are not entirely of a certain school either. The individual is handicapped by ignorance,

superstition, and isolation. All the conditions are present for the development of fear, shame, resentment, a feeling of inadequacy, the most painful emotions, with secretiveness added thereto. Many are willing to escape them by a neurosis, but to express in terms of sex, love of power, or money, fear of pain or death, the satisfaction of food, delights of the eye and ear, the disappointment of failure, the pleasure of work well done, however sublimated, is a narrow conception of man.

Many real organic lesions are harmless and symptomless, but prolonged fear, disappointment, resentment, anxiety, regret, and perplexity are never symptomless. Fears take many forms, and are accompanied often by trouble. Some symptoms, such as fear of losing the mind and headache, fear of cancer and abdominal distress, mild melancholia, feelings of uselessness, are often hidden in some form of ailment, and failure to recognize the condition in time often results in the patient becoming a suicide. Forgotten, severe experiences are sometimes aroused by some recurring stimulus and expressed in some physical complaint.

In treatment, emotional and intellectual movement must occur, for their stagnation is worse than intestinal stagnation. Rest in bed is prescribed for the psychasthenic. The psychotic are unadaptable to the efficiency of the upper level of society and gravitate to pain, prostration, and sanatoria.

People who are very far ahead of their times or very far behind are unhappy; for life must be seen as it is, as well as according to their ideals. The simple rearranging of the patient's life and the environment to fit his nerves with proper explanation of normal phenomena will clear away many phobias. The temperamental person with the neurosis from confusion in life's perplexities can become one of the most optimistic of persons and a valuable member of society. (A. H. E.)

WILLIAMS, F. E. *Anxiety and fear.* Jour. Mental Hyg., Vol. IV, No. 1, January, 1920.

The precautions, such as involuntary reflexes, voluntary acts, clothes and houses, with which we are equipped to protect our physical selves, are familiar to us. But of greater importance is it to prevent the more frequent, the more hurtful, and the more lasting injuries to our personality which beset us at every turn. There are, therefore, found conscious and unconscious means of protection against this type of injury. Mental mechanisms exert their influence in both psychic and physical fields. There are psychic mechanisms essentially protective of mental integrity just as the instincts of self protection, of acquisition, and of pugnacity are expressions of phy-

sical protection. A mental pathology arises when this protection is insufficient either by reason of the failure of a mechanism, or of one which is defective or false.

As the individual becomes older and assumes more responsibilities, life becomes more complex, and adjustments more difficult to make. The effort to compromise between instincts and social demands, and to harmonize reality with imagery becomes too great. Then forgetfulness is useful. Hurtful memories are pushed away. Eventually a disagreeable but real situation is denied and a false but pleasant one, or interpretation of one, is accepted. One makes false excuses to others, then to one's self, which become accepted as facts and lead to false attitudes. It is a common way of escaping reality, and of living in a world of unreality and day dreaming. Individuals with feelings of inadequacy frequently buckle about themselves an armor of hauteur, reenforcing the ego, as it were, with an attitude and feeling of superiority, as if by this means to frighten away attack.

Conflicts between the complex and the simple, between reality and unreality, between social order and instinct, all require adaptation and compromise. Conflicts between the social order and instincts are often the most difficult and have probably the highest morbidity rate. Repressed instincts give rise to desires, and these desires to emotional states. Physical expression through the organs of the body is constant, but the adaptive power of the individual is variable. There are all degrees of adjustment and maladjustment, from contentment and efficiency, down through unhappiness and restlessness, to frank failure, or even to an outward revolt and antisocial or criminal conduct. Sometimes an acceptable compromise is reached. Some consciously simplify their lives, many take up religion, others seek congenial pursuits. A residuum is found in an undercurrent of unhappiness, or a feeling of discontent. A few find the problem too difficult and by a short cut try to simplify or localize the general conflict, taking refuge in a neurosis or psychosis, the process being of course an unconscious one. The war neuroses are striking examples of this. The reaction is one of instinct versus social ideals, followed by autosuggestion from a memory of a previous injury, then a hysteria expressed in a paralysis or aphonia. In an officer this is expressed in an increasing anxiety, his feeling of inadequacy from fear gives way to one of disgrace, then there is physical impairment from loss of sleep, poor appetite, etc.—an anxiety neurosis.

A neurosis is a partially successful compromise between the elements of the conflict. The person who is ever worrying and anxious has made a more successful compromise, while the most successful of the incomplete compromises, and the most frequently met, are the benign worriers. Anxiety, worry, fear, and their concomitants,

insomnia, restlessness, and unhappiness, mean conflicts. They may be due to obvious and simple relations with human or material elements. Often, however, the real conflict is deep in the subconscious, frequently spurred into action by remotely connected external instances and stimuli. The powerful natural and normal reactions from real factors in real life must, however, be recognized and properly evaluated. The anxiety and worry of a real conflict is out of all proportion to the reasonably assigned course.

The treatment consists in sympathetic explanation and guidance. Further conflicts only are precipitated by treating such cases as malingerers. The steps of the development of the condition should be retraced backward. Attention of the patient must be drawn to both elements of the conflict and away from its symptoms. These should be clearly explained, and effort be made to reestablish the normal perspective and to develop directness and frankness in the patient's mental life. (A. H. E.)

SURGERY.

FURNESS, W. H. and LEE, W. E. **Blood transfusion.** Penna. Med. Jour., Vol. XXIII, No. 10.

The essential difficulty in the performance of blood transfusion is the element of coagulation. Efforts must be directed toward minimizing the trauma of the cellular blood elements. The elimination of the element of coagulation by the addition of a chemical has revolutionized the whole procedure, but the consensus of opinion of the Interallied Surgical Congress in 1918 was that whole blood gave more satisfactory results than the citrated. The relative merits of whole blood and citrated are by no means settled. Sodium citrate induces slight abnormality in the blood cells, as evidenced by increased fragility and increased tendency to hemolyze. In diseases of the blood, as in the various anemias, especially when the disease is hemolytic in nature, the whole blood is to be preferred. In hemorrhage, where the indication is not so much to replace pathologic blood as to furnish blood volume and oxygen-carrying capacity, the citrate method may be used.

Transfusion of blood is the optimum procedure in hemorrhage. The bleeding point should be controlled before the transfusion is started. Rarely should more than 500 mls be given the first time. Favorable results follow transfusion in hemorrhage from gastric ulcer. When the blood pressure falls below 100 the blood should be slowly introduced and the total quantity not exceed 400 mls. In postoperative hemorrhage, when the bleeding point is not accessible, it is better to start the transfusion before the anesthetic.

17908—20—15

After 100 to 150 mls have been introduced the transfusion is stopped and after the bleeding has been controlled the transfusion is again started and completed. When the bleeding of a hemophilic can not be stopped by local means, transfusion has proved invaluable. (L. W. J.)

PEMBERTON, J. DEJ. **Dangers associated with blood transfusion.** Jour. Iowa State Med. Soc., Vol. X, No. 6, June, 1920.

The principal dangers associated with transfusion of blood are: (1) The introduction of air and blood clots as emboli, (2) acute dilatation of the heart, (3) transmission of infection, and (4) agglutination or hemolysis of the donor's corpuscles. To-day, with our simple method of transfusion (citrate method), the danger of introducing into the circulation sufficient air to produce any ill effect can be easily avoided. By the employment of a small caliber needle and allowing the flow of blood to be under low pressure, the introduction of blood clots of sufficient size to produce harm can be absolutely prevented.

The danger arising from an acutely dilated heart demands constant recognition. In the aged with marked arteriosclerosis, in the extremely anemic with the resultant myocardial impairment, and in others with suspected cardiac lesions, the quantity of blood injected must be limited and caution must be exercised to avoid the too rapid loading of the right heart.

The possibility of a patient being infected with syphilis can not be ruled out until after a thorough examination by a competent syphilographer in conjunction with a negative Wassermann.

The chief immediate danger in transfusion is the introduction of incompatible blood into the vein of the patient. The gravity of this danger depends on the extent of the destruction. Fortunately, in most instances, the reaction becomes manifest after the introduction of 50 to 100 mls of incompatible blood, and if the symptoms are recognized and the operation quickly concluded the condition will probably not prove fatal. These reactions are absolutely preventable by blood tests performed by competent laboratory workers. (L. W. J.)

QUAIN, E. P. **A mixture of ethyl chloride, chloroform, and ether for general anesthesia.** Am. Jour. Surg., Vol. XXXIV, No. 7.

Quain recommends a mixture of ethyl chloride 5, chloroform 1, and ether 24 mls, making a total of 30 mls for each anesthesia. It is given by the closed method in a rubberized bag.

A piece of thin, strong rubberized linen is cut into an oblong or circular shape, 55 by 65 cm. This is hemmed around the margin and a puckering string inserted so that the material can be drawn

into a mask to fit over the face. A hole is cut in the center of the cloth about 2 cm. square. Two oblong pieces of cotton flannel are prepared, each large enough to fit over the patient's face. The mixture is prepared in a 1-ounce bottle. A strip of adhesive plaster is fastened to the bottle and on it are marked the 5, 6, and 30 mil levels. Ethyl chloride is put into the bottle to the 5-mil mark, then chloroform to the 6-mil mark, and ether up to the 30-mil mark. The liquid is thoroughly mixed.

One of the pieces of flannel is placed over the patient's face and the other in a small cup or pus basin. The contents of the bottle are poured over the flannel in the basin, which absorbs the whole mixture. The flannel is quickly picked up and spread over the other piece on the patient's face. The patient is told to hold his breath before the saturated cloth is applied and until the mask is adjusted. The mask is placed over the face and the puckering string drawn tight and tied. The patient is then told to take short breaths. He will lose consciousness quickly from the ethyl chloride, and after 6 to 10 deep inspirations the incision may be made. The mask causes re-breathing and the respiratory center shows distinct stimulation throughout the anesthesia. The anesthesia from the dose given lasts 12 to 20 minutes, and if this is not long enough, it may be continued by ether given through the hole in the mask.

There is not always complete relaxation. Some patients show a short period of excitement after the first inspiration. There is practically no excess of mucus in the throat; nausea is uncommon. In 400 cases there were no deaths from the anesthetic, no syncope, no alarming cyanosis, and no serious difficulty with respiration.

It is recommended as the method of choice in operations which can be completed in 15 to 20 minutes as for minor injuries and wounds. (L. W. J.)

PEMBER, J. F. **Skin grafting.** Jour. Iowa State Med. Soc., Vol. X, No. 6, June, 1920.

The three important methods of grafting are those of Reverdin, Wolf, and Thiersch. Reverdin's technique consists of lifting a small portion of skin on a needle, removing it with curved scissors and placing it, with many like it, on the denuded area. These grafts at first apparently disappear, owing to disintegration of the epidermis, but later they appear as bluish-white spots, from which the epithelial growth proceeds in all directions.

Wolf's method consists in cutting a piece of skin one-sixth larger than the area to be covered, removing all fat from it and placing it in the defect, from which all scar tissue has been removed. When

skin is transplanted from a negro to a white man, the pigment gradually disappears and vice versa. (Maj. Gillies's work shows that skin transplanted to a mucous surface gradually assumes the characteristics of mucous membrane. L. W. J.) Healing of a Wolf graft occurs in three to five weeks. (The rapidity of healing depends on the richness of the blood supply of the part. L. W. J.)

The Thiersch graft has four points of marked value—greater resistance, less shrinkage, better cosmetic effect, and more rapid healing. The surface to be grafted must be free from necrotic tissue and covered with a healthy, firm granulation tissue. A stained smear under the microscope should show a bacterial count of six or less organisms to the field. The patient himself is the best donor. The epithelium rapidly recovers the areas denuded by the skin-grafting razor and within six weeks the same area is capable of yielding excellent grafts.

The dressing of the grafted area and its after care are of much importance. Good results are obtained by the use of strips of gutta-percha moistened with normal salt solution and placed in a criss-cross manner over the graft. Dry gauze is placed over this and the dressing left undisturbed for several days. Net saturated with melted paraffin may also be used as a covering.

In the discussion of this paper Dr. Emil G. Beck, of Chicago, described a method which he has used for several years to obviate the necessity of skin grafting in suitable cases. Large areas of granulating surface may be covered with skin by promoting the growth of the skin from the edges. The edges of the skin are cleaned of granulations and then a piece of adhesive is so placed as to cover the granulating surface and the adjacent skin. In 24 hours the adhesive is removed and a bluish border is seen around the skin edge. The next 24 hours the wound is covered by gauze, and again in 24 hours the adhesive is applied. In this way the gradual growth of the skin over the entire surface may be observed. (L. W. J.)

PASSOT, R. *Esthetic autoplasties for baldness.* Press. Méd., April 17, 1920.

Following a preamble, in which he justifies every effort directed to relieve the subjective suffering entailed by physical blemishes and deformities and designates these efforts as cosmetic or "esthetic surgery proper," the author outlines a new method of relieving baldness. It is applicable to those numerous cases in which the deficiency of hair is restricted to the vault or dome of the head, and consists in denuding the bare area and grafting upon it longitudinal fore and aft flaps from the hairy scalp at the side of the head. The desired

result can be obtained by one or more flaps, which are swung around a posterior pedicle and laid along the sagittal suture or on either side of it. The hair is allowed to grow long, is parted in the middle, and brushed so as to conceal the original defect.

The technique is simple, the essential feature being an accurate measurement of the bald area and the provision of sufficiently copious flaps to cover it. The pedicles should be in the neighborhood of the posterior occipital protuberance and the flap or flaps calculated to reach nearly to the frontal protuberances. It is best not to make the flaps too long, out of consideration for their nutrition, especially as it is not imperative to have hair as far in front as in normally hirsute individuals. The flaps should, however, be cut as low as possible, since the side of the head is the *ultimum moriens* of the cephalic hairs. Local anesthesia must be secured by very dilute solutions, owing to the extent of the surface involved. The injections must be confined to the margins of the flaps, because cellular growth is strongly inhibited by the ischemia and reactionary congestion of cocaine and adrenalin. Let the injections be subcutaneous, and not intradermic, and begin at the angles and be confined to the margins of the flaps.

Prior to operation the hair is cut short and the flaps, etc., marked out with sterile india ink or methylene blue. The flaps are dissected with strict regard to the plane of cleavage of the aponeurosis. To prevent torsion of the pedicles, the incisions freeing the flaps posteriorly should be cut somewhat obliquely. In cases where the baldness is slight, one flap anchored mesially is enough. If two lateral flaps are required they should be cut and sutured at two sittings, the second operation being delayed until the first graft is well anchored in position. Flaps may also be used for transverse grafting from side to side. In this case the pedicle is anterior and lateral, located in the temporo-frontal region. (J. S. T.)

DANFORTH, W. C., and CORBUS, C. Tumors of the bladder. Surg. Gynec. and Obstet., September, 1920.

Within a period of seven months the authors observed 7 cases of bladder tumor of which 3 were carcinomatous, 3 were papillomata, 1 was a condyloma. The latter closely simulated a true tumor as studied cystoscopically. The detailed account of the symptoms in the nonlucetic cases shows that hematuria was the principal and significant one. In one case there was nocturnal dysuria. In another there was vague subjective discomfort in the vesical region for 10 years and intermittent hematuria for five years before coming to the

attention of the writers. Hematuria, then, is the cardinal symptom of vesical growths and calls for immediate investigation by most careful cystoscopy. Careless instrumentation increases the bleeding. Pyuria is frequent. A pedunculated growth may permit obstruction to ureteral discharge and cause intermittent stoppage of urine.

The luetic growth disappeared under specific treatment. Syphilitic lesions of the bladder have received little notice in medical literature though between 1551 and 1767 cases were occasionally verified at autopsy. Between 1872 and 1900 a number of cases were diagnosed by the therapeutic test—disappearance of symptoms under specific treatment. The first dissertation on syphilis of the bladder published in English was by Corbus appearing in Cabot's *Modern Urology*. The bladder, through warmth and moisture, offers an ideal bed for the growth of the spirocheta pallida, and the thin lining of mucous membrane has some resemblance, so far as favorable conditions for growth of the organism, to the circumanal tissues. The luetic tumor of the bladder may be warty and papillomatous instead of flat and the coalescence of several lesions causes a large cauliflower mass.

Lesions of the tertiary period (gummata) located in the bladder closely resemble papillary carcinoma and the late period of life being that attended by the danger of malignant growths intensifies the difficulty of diagnosis. A positive Wassermann reaction may cause confusion since a malignant tumor can, of course, coexist with syphilis.

Treatment of nonluetic cases consisted of: (1) Suprapubic cystotomy and removal by cautery; (2) fulguration through the cystoscope; (3) suprapubic cystotomy with destruction of tumor by diathermy. (Each of these procedures may be followed by radium.)

Transurethral fulguration, repeated from 1 to 10 times, is applicable to small, nonmalignant tumors. Large tumors should be attacked directly by the suprapubic, extraperitoneal route. Whatever the means employed to remove the growth, the operation should be followed by radium therapy. The authors use an instrument modeled on that of Young. They have applied 50 mg. at a time, using a screening of 0.5 mm. of silver and 1.0 mm. of brass covered by thin rubber, the applicator remaining in contact with the growth from 6 to 12 hours.

Radiation of bladder tumors may be practiced through rectum and vagina. It is interesting to note that the application of radium to one tumor sometimes leads to the spontaneous disappearance of others. (J. S. T.)

HYGIENE AND SANITATION.

FORSTER, H. W. **Hospital fires and their causes.** *Mod. Hosp.*, Vol. XV, No. 2.
(See *Quarterly of American Fire Protection Association*, April, 1920.)

Automatic sprinklers give the best means of lessening danger from fire and should be installed in spite of the prejudice against them because accidental operation may do damage. Prevention of fire is more important than methods of subduing it, and structural material must be considered first of all. Next, perhaps, in importance is architectural design by which means of egress are carefully calculated. With this goes the problem of suitable alarms, etc.

Studies of fires in institutions in 1916 and 1917 show that heat hazards, matches and smoking, lightning, sparks, electricity, oils, and hazardous materials and gas are the leading causes, about in the order given, though the percentage is not identical for the two years. About 6 per cent of fires in hospitals are ascribable to the presence in them of inflammable supplies such as ether, alcohol, and gasoline. The bulk of these supplies should be stored in outbuildings or in suitably ventilated and drained fire-resisting vaults. Gasoline should be kept in underground tanks, should not be handled in open containers or used for cleaning purposes inside a building. Static electricity may be generated in the cleaning process. Many of the metal polishes used in bright work contain gasoline or benzine and are highly dangerous. Dangerous, too, are the materials employed for mending hot-water bags, rubber gloves, etc. Oils and paints must not be stored in buildings occupied by patients, but in special buildings provided with metal lockers or in cabinets having drip pans and self-closing doors. For lubricating ward and corridor floors mineral oils are safer than linseed-oil mixtures, but the use of any oil for this purpose is to be deprecated.

Cotton or gauze should be kept away from the danger of contact with spark or flame and only small quantities stored in wards and places accessible to patients, smokers, etc. Moving-picture films are a menace, since they ignite very easily, burn rapidly, and give off a stifling smoke. Hence only approved machines, properly installed and handled, should be used. Slow-burning or "safety" films are in the market and are of course preferable for hospitals.

Rubbish should be collected in metal containers. There must be no accumulation of wrapping paper, packing material, old clothing, etc., in any part of the building.

Heating equipment accounts for 20 per cent of fires in institutional buildings. Such equipment should be installed in a separate incombustible building. All flooring under ranges should be of incombustible material. Chimneys should be supported directly in the ground and have at least 8-inch brick walls and flue lining; but for one

story buildings 4-inch walls suffice. Chimneys and stovepipes should be thoroughly cleaned each autumn before fires are started.

The danger from steam pipes in contact with woodwork is not generally appreciated. The heat chars the wood which later takes fire "spontaneously." Stovepipes must not lead through attics or other concealed spaces, must be properly riveted at the joints, and supported and surrounded by proper air spaces.

When fireplaces are used they are agreeable and attractive as accessory heating agencies but require the closest supervision. No drying of bedding should be permitted before a fireplace.

Electricity is the safest illuminating device but has its disadvantages. Excessive voltage destroys insulation. After proper installation frequent inspections are indispensable.

Where gas is used exposed flames must be protected by wire guards and shades. Unless there is a clearance of 2 feet, heat belts and other safety devices must be installed.

Kerosene lamps are extremely dangerous. Burners should fit tightly. The wicks must be of suitable width and length. The lamps must be kept scrupulously clean and filled outside of the main buildings. The lamp should be of metal rather than glass to avoid breakage.

Only safety matches are to be tolerated in hospitals and smoking must be restricted to appropriate designated places.

From this summary of Dr. Foster's article it is clear that the installation of a few fire extinguishers and a monthly or weekly fire drill, carried out in a perfunctory manner and viewed as a subject of jest by the bulk of the participants, does not represent the full discharge of the duty of the hospital staff in relation to fire prevention. (J. S. T.)

DI MATTEI, P. *Coffee and vitamines.* Pollicinico, Rome, XVII, 37. September 13, 1920.

Food deficiency diseases constitute an important but very incompletely written chapter in the subject of nutrition. The disturbances of polyneuritis easily produced in pigeons by feeding with highly polished rice and the therapeutic action of certain substances can be utilized for interesting experiments. Many natural vegetable substances and others, artificially prepared from piridine, xanthine, etc., are of value in these cases. The relation of vitamines to nitrogenous extractive products due to metabolism has suggested investigation of coffee infusions as a remedy in polyneuritis. This could be approached as a chemical problem considering the purin bodies eliminated by the kidneys or from the functional standpoint starting from the stimulating and activating demand of tissue cells. As it is

agreed that vitamins are destroyed by a heat above 115 C. and the roasting of coffee requires some 250 C. it seemed a foregone conclusion that coffee infusion could not possess any action, but experiments have demonstrated the contrary and shown that they possess marked curative power in the morbid conditions produced in pigeons by deficiency in vitamins.

The mere administration of 8 c. c. of 5 per cent mocha infusion succeeded in a few hours in completely altering the polyneuritic picture in a number of pigeons who soon showed only a trifling disorder in their gait. This residual symptom disappeared completely in a few days and the pigeons resumed all their wonted vivacity and energy and showed no trace of nerve derangement so that they could be called cured. With erect bodies, unruffled feathers, full powers of flight, active normal step, and able to run rapidly they now partook without harm for a number of days of the usual daily ration of rice 30 grams with coffee infusion increasing from 12 to 20 c. c. daily.

However, there was no gain in weight. There were minor fluctuations but no positive increase, and this state of affairs continued for weeks, the coffee seeming to negative in every other respect the effect of the polished rice and to be superior to other substances employed for this purpose and more lasting than the vitamins described by Funk. But the nugatory action of coffee does not continue indefinitely. In a month or six weeks paralytic and cerebral symptoms appear suddenly and death quickly supervenes. In some of the experiments the beneficent action of coffee is less conspicuous. The nerve disturbances seem arrested, but the pigeons finally die. This never occurred, however, in less than 15 days.

Experiments with pure caffeine did not give as striking results as when the infusion was employed. With caffeine a more violent attack occurred in the sixth or seventh day and death followed, though without the usual prodromes of cerebral and bulbar depression. Hence it is concluded that while caffeine may be classed with those purin derivatives which have some action in experimental polyneuritis, it is the coffee infusion which really produces a striking inhibition of nerve disturbance in pigeons. The infusion, if not actually curing, has an inhibitory power so striking that clearly some virtue must be ascribed not to a single substance but to the combination of substances developed by roasting. Some of these are known—hydroquinone, methylamine, etc.—and, if not actual vitamins, they are no mean synergists and play a useful part in the treatment of the so-called food deficiency diseases. But the coffee vitamins do not belong with the substances that make for gain in weight and divided by MacCollum, Davis, and others into “fat soluble A” and “water soluble B.”

By way of testing the value of the substances credited with power to stimulate nutrition and resistance to waste, the author has conducted experiments to determine the effect of feeding vitamins in excess. Wheat bran was employed in these tests. Pigeons fed on this alone lost weight rapidly, and accordingly a few grammes of rice were allowed in addition to supply the minimum carbohydrate requirement. The bran was fed to the pigeons in the form of a pasty mass by mixing with water. No toxic effects were observed from the excess of nitrogenous material ingested. While this diet could not, as was anticipated, compensate for the lack of necessary food elements, it proved to have a stimulating power on metabolism to such an extent that the pigeons subsisting on it endured without serious consequence a loss of weight and a lowering of temperature well below the limits fixed by Chossat as compatible with life. After two months the pigeons had lost considerably more than four tenths weight and showed a lowering of temperature comparable to that of starving men and animals, though possessing distinct resistance and activity (J. S. T.)

TROPICAL MEDICINE.

CHRISTOPHERSON, J. B. **Bilharzia disease: Sterilization of the ova during cure by antimony.** Jour. Trop. Med. and Hyg., Vol. XXIII, No. 13, July 1, 1920.

Antimony tartrate may be given in complicated cases of bilharzia disease, but should be used with great caution. The author believes that a patient should be treated with antimony until all the ova coming away are rendered sterile, viz, when the ova become granular, shriveled, blackish in color, when their double contour is disappearing and they do not hatch. Therefore the microscope is the most practical means at hand for determining the quantity of antimony (tartrate) necessary to inject. Basing his results on a large number of cures extending over a period of two years he found the average dose for an adult to be 20 to 30 grains, generally the minimum amount. In uncomplicated cases where he can not find ova to note the effect of the drug on them he fixes the dose at 25 grains. He found the lethal dose to vary, and in one instance treated a case of kala-azar in a Sudan boy of 18 years with 89 grains in 115 days before he noted a cure.

Christopherson thinks that when giving antimony one should thoroughly study the case and observe the effects of the drug on the patient. He claims that the toxic effect of the drug on the internal organs is shown early by the urine. The albumin in the urine should be watched carefully, and it will only cease when the

antimony injections are suspended. Should sterile ova not result when 30 grains of the drug have been given he suspends operations and gives a second course of treatment with the drug at a later date. (G. A. G.)

MCDONAGH, J. E. R. **The treatment of bilharziasis with antimony.** Jour. Trop. Med. and Hyg., Vol. XXIII, No. 13, July 1, 1920.

After he successfully treated three cases of sleeping sickness with antimony (when it was found impracticable to continue arsenobenzenes therapy) the author decided to use the same drug in bilharziasis. He found that tartar emetic was a most useful drug in many resistant chronic conditions and believes that antimony has its uses in certain chronic cases of gonorrhea. "So far as protozoal and bacterial infections are concerned antimony appears to be the best metal to employ in those cases where the organism is intracellularly situated. In such infections antimony acts indirectly on the parasites by stimulating the oxidizing action of the protective substance." Whether it acts in this manner or directly on the worm in bilharziasis is at present undetermined.

The author found that tartar emetic is the drug of choice in antimony administration, and because the intramuscular injections are extremely painful he uses the intravenous route. Ampoules containing 10 c. c. of distilled water and one to one and a half grains of tartar emetic are diluted in 100 c. c. of distilled water before administration. This dilution tends to prevent venous thrombosis and shock. Ten injections with five-day intervals are required as a rule. The bleeding begins to stop after the first injection or two, and the ova to gradually disappear as the injections are continued. (G. A. G.)

EYE, EAR, NOSE, AND THROAT.

POSEY, W. C. **Etiology and diagnosis of glaucoma. Control by myotics.** Arch. Opth., Vol. XLIX, No. 3.

There are two principal theories to account for the rise of intraocular pressure: 1. Hypersecretion through nervous irritation. 2. Retention due to mechanical obstruction to outflow of fluids from the eye. Von Graefe and Donders were the originators of the hypersecretion theory which was adopted by DeWecker, Galezowski, and Schweigger. But repeated observations have shown that considerable alteration in the sympathetic nervous system may cause no increase of ocular tension.

Lagrange holds to the hypersecretion theory as the main cause of glaucoma due to disorder of the sympathetic and to changes in the

blood or vessels. One of these factors suffices but together they produce a greater effect. As a secondary but important factor is the obliteration of excretory channels. The retention theory is based on the fact, according to the researches of Knies, Weber, Priestley Smith, and Collins, that primary glaucoma occurs in eyes predisposed to it by certain peculiarities. This predisposition depends, as Fuchs puts it, on insufficient spatial relations, which may either affect the eye as a whole or particularly the region of the anterior and posterior chambers. Priestley Smith has proved, in a manner that is conclusive to most ophthalmologists, that a want of space between the crystalline lens and the parts which surround it is a frequent predisposing cause of primary glaucoma. As long as the circumlental space is patulous, the eye is free from the disease, but as soon as this space is contracted the lymph secreted from the ciliary body becomes dammed up in the vitreous, which increases in volume, and pushes the lens and iris forward, reducing still more the depth of the anterior chamber. After a time, if the increased tension is maintained, the root of the iris becomes agglutinated to the cornea at the angle of the chamber, and the chief avenue of escape of the intra-ocular fluids is permanently blocked.

This is conclusive for primary glaucoma, but does not explain all cases. A number of writers have adduced the influence of arteriosclerosis, but Rohmer holds that they claim too much. Priestley Smith's figures seem to prove that the relation of glaucoma and senility is more than a matter of increased blood pressure.

Certain facts in connection with glaucoma have been proved. For example, we know that the tendency to glaucoma increases with age and that late middle life exhibits the best soil for its growth, although senility and extreme youth are not exempt. Men are slightly more liable than women, and this is especially true of cases occurring prior to 60 years of age. Although small eyes are predisposed to glaucoma, the character of the ametropia present has no relationship in inducing glaucoma. The influence of heredity can not be gainsaid, as Elliot aptly puts it, being revealed both in the race and in the family. The liability of Hebrews is recognized, and Elliot thinks the disease abnormally prevalent in India. Priestley Smith attributes the etiological factor in hereditary glaucoma to the transmission of eyes abnormally small and suggests that the cornea of all individuals from a suspected stock be measured, so that in the event of the diameter being found too small, precautionary measures may be taken. Glaucoma is a binocular affection and Zentmayer's and Posey's figures showed that in their cases an average period of 20 months intervened between the manifestation of the symptoms in the two eyes.

As regards diagnosis glaucoma is essentially a disease which is attended by loss of visual acuity, but the absence of this symptom, as is well recognized, does not preclude the possibility of the hardening process, for in 36 eyes with other well-marked symptoms of the disease central visual acuity was normal. When reliable information is desired of the visual condition a study of the fields is, of course, imperative. After loss of sight, headache is the most prominent symptom, 44 patients stating that they suffered from it. This symptom did not affect all similarly; 11 described it as being temporal in character; 14 as frontal; 77 as occipital; while in 3 instances it took the form of a hemicrania. Eight asserted positively that they never had any pain in the head.

The most constant sign of glaucoma visible upon simple inspection is shallowing of the anterior chamber, due, in most instances, to a forward displacement of the lens. Though suggestive of glaucoma, a shallowing of the chamber does not necessarily indicate increased intraocular pressure, for it may be occasioned by a lens of excessive thickness or be due to an advance of the anterior surface of the lens of natural growth. Nor is the size of the pupil in the early stage of much help, for in most instances there is but slight if any departure from the normal, either in size or reaction. The cornea is clear and there is seldom sufficient enlargement of the scleral vessels to declare that they are actually engorged.

Ophthalmoscopically the first thing to excite suspicion of glaucoma is the tendency of the scleral ring to become visible all around the disk and its disposition to broaden, especially to the temporal side. This broadening of the ring goes hand in hand with the extent and depth of the excavation, though it usually preceded any definite cupping of the disk.

Excavation of the head of the nerve is almost pathognomonic. Although the excavation shows a marked predilection to occupy the temporal half of the disk, no part of the nerve escapes. In some cases it appears at the temporal edge of the disk as a continuation of a physiological excavation. From here it gradually spreads over the head of the nerve, encroaching upon its structure until only a narrow rim of nerve fibers remains at the nasal edge.

Other signs of increased intraocular tension, such as the choroidal halo and the venous and arterial pulses, occur in such a small proportion of early cases that they can not be looked upon as constant factors of the disease and their absence can not be regarded as negative evidence for the existence of a glaucomatous state.

As regards treatment Posey has already called attention to the value of myotics in chronic glaucoma. Thus, in 1908, he analyzed a series of 65 cases, of which all but 7 had been observed over a period

of 2 years, and 12 for more than 10 years, and the results attained by the constant and prolonged use of these drugs were favorably compared with the similar series of cases treated by iridectomy. Among the percentages deduced from this analytical study, it was found that central vision was maintained in the myotic series, each of whose cases was observed over an average period of 5 years and 8 months in 80 per cent of the cases, in comparison with 25 per cent in the most favorable group of iridectomized eyes. In 1914, he published additional details regarding 13 of the cases reported in the 1908 group, and added an analysis of 18 new cases also followed over a prolonged series of years.

Of the cases remaining from the 1908 group series, but 22 eyes could be analyzed, as 3 were blind when they came under observation, and 1 had been iridectomized.

Of the 22, 17 eyes were either normal or showed but the earliest traces of glaucoma at the first examination; in 3 the disease was moderately advanced, while in 2 the glaucomatous process had progressed to such an extent that but little vision remained. Fourteen eyes of this first group retained practically normal vision and field as long as they were under observation, a general average of 10 years. Three went blind while under treatment, in 5, 6, and 10 years, respectively. Of the 3 eyes in which the disease was but moderately advanced, 1 went blind in 2 years; the others maintained vision 8 and 10 years, respectively. The results attained in 2 eyes in which the disease was farthest advanced were strikingly good, vision and field being maintained without further loss in one case for 10 years, while in the second but a slight loss was recorded during the same period. Of the 18 cases reported for the first time, but 24 eyes were capable of analysis.

Of these 24, 13 showed but the rudiments of the disease (at the first examination in 8), while in 3, central vision and the visual field were greatly compromised. In the first group practically normal vision was maintained while the cases remained under observation for a period ranging from 5 to 18 years, an average of $7\frac{1}{2}$ years. In the second group of 8 eyes, vision was maintained for periods ranging from 2 to 10 years, an average of about 4 years, while in 3 eyes, which were in the most advanced stage of the disease, vision was maintained for periods ranging from 1 to 6 years, an average of 3 years.

Myotics, like operative procedures, are most effective if used early, and they must be continuous—that is, every three or four hours, daily, without interruption, throughout life. Hence, the cooperation of the patient is absolutely indispensable. Where there is doubt as to the patient's willingness and ability to do his part faithfully operation is advised. Again, operation is advised for the worse eye

in patients under 55, and myotics are to be used in both. Operation on the second eye should follow if operation has produced better vision in the worse one.

The following regimen should also be prescribed in every case: Massage of the eyeball; careful refraction at not infrequent intervals; restriction of the use of the eyes for close work; a proper amount of exercise in the open air; favorable climatic conditions. The skin should be kept active, the intestinal apparatus regulated, and any local source of inflammation or irritation, neighboring on the eyes, such as inflammation in the nasal passages or their accessory sinuses, should be allayed. Particular care should be given to the peripheral circulation, nitroglycerin and strophanthus being often of value. Strychnine should be administered, not only on account of its action on circulation, but also for its influence on the optic nerve. On account of their antirheumatic properties the salicylates are of decided value, and should be administered frequently for continued periods. Patients should abstain from tobacco and alcohol and, in so far as possible, be relieved from business and other cares. (C. N. M.)

MILLER, E. B. Corneal disease of tubercular origin; diagnosis and treatment by tuberculin. Penn. Med. Jour., August, 1920.

The subject is not new but deserves more study than it commonly receives and the fact should be emphasized that even cases showing Hutchinson's teeth and a positive Wassermann may have a tubercular origin and clear up rapidly under the proper treatment. There is often a lack of precision in methods of examination which perhaps explains why more cases of what Haab calls "letter keratitis" are not reported. Powerful oblique illumination in letter keratitis shows linear irregularities taking the form of the letters A, W, V, or X, the sides or interspaces of the letters being marked by round infiltrates.

There are four classical types of corneal disease in which tubercular infection is frequently present and tuberculin is of diagnostic and therapeutic value.

1. *Phlyctenular or scrofulous keratitis; phlyctenular keratoconjunctivitis*.—There is some evidence that the lesions are of tubercular origin. They may be caused by toxins. No living germs have ever been found in them. The disease may occur independently or in combination with eczema of the conjunctiva. The pustules are always round but vary in size and number. The small vesicles begin as minute grayish elevations which by loss of epithelial covering rapidly change to depressions. They may heal in from 8 to 10 days. Large pustules may penetrate deeply and lead to perforation.

2. *Migratory pustule, fascicular keratitis*.—Here the ulcer leaves the periphery and tends to the center of the cornea. The bundle of minute blood vessels appears to push before it the small, terminal, crescentic, gray elevation. Permanent impairment of vision is a common result of the stripelike opacity produced.

3. *Parenchymatous, interstitial or diffuse keratitis* is important from its seriousness rather than its frequency. In the majority of cases it occurs between the ages of 5 and 16. It begins as a faint, gray haze and ciliary congestion in a narrow marginal band. Gradually wider portions are involved, and the tonguelike projections toward the center coalesce till all the marginal zone presents a cloudy film. With advance toward the center the density of the infiltration increases. There is spasmodic closure of the lids. The corneal surface is cloudy and the epithelium has the steamy, stippled appearance that goes with increased intraocular pressure. As the central opacity increases, the margin clears up and areas of transparency appear among the gray spots. The secondary stage is the "keratitis punctata," sometimes interpreted as a distinct primary lesion.

4. *Sclerosing keratitis* is commonest in rheumatic subjects as part of a general scleritis. Portions of the cornea near the scleral foci become opaque and finally white. The cornea loses its circular outline.

The author emphasizes the probability of a general tubercular origin for these types. Repeated von Pirquet tests followed by diagnostic injections of tuberculin often succeed in eliciting a positive reaction. Cases with positive Wassermann, etc., may drag along until tuberculin is used and then speedily clear up. Unfavorable results are due to careless methods of administering tuberculin which should be exhibited in slowly increasing doses. Dr. Miller uses a special syringe graduated in minims and tenths, and has worked out a series of tables for simplifying the graduated therapy that he considers essential to the best results.

KOCH'S OLD TUBERCULIN DILUTIONS.

No. 1.		No. 3.		No. 2.		No. 4.	
2	M—1/1,000 mg.	3. 3	M—1/60 mg.	3	M—1½ mg.	2	M—1 mg.
2. 2	M—1/900 mg.	5	M—1/40 mg.	3. 5	M—1¾ mg.	2. 5	M—1¼ mg.
2. 5	M—1/800 mg.	10	M—1/20 mg.	4	M—2 mg.		
2. 8	M—1/700 mg.			4. 5	M—2¼ mg.		
3. 3	M—1/600 mg.			5	M—2½ mg.		
4	M—1/500 mg.	2	M—1/10 mg.	5. 5	M—2¾ mg.		
5	M—1/400 mg.	2. 5	M—1/8 mg.	6	M—3 mg.		
6. 5	M—1/300 mg.	3. 3	M—1/6 mg.	6. 5	M—3¼ mg.		
10	M—1/200 mg.	5	M—1/4 mg.	7	M—3½ mg.		
		10	M—1/2 mg.	7. 5	M—3¾ mg.		
				8	M—4 mg.		
				8. 5	M—4¼ mg.		
				9	M—4½ mg.		
				9. 5	M—4¾ mg.		

10 M—5 mg.	13.5 M—6¼ mg.	17 M—8½ mg.
10.5 M—5¼ mg.	14 M—7 mg.	17.5 M—8¾ mg.
11 M—5½ mg.	14.5 M—7¼ mg.	18 M—9 mg.
11.5 M—5¾ mg.	15 M—7½ mg.	18.5 M—9¼ mg.
12 M—6 mg.	15.5 M—7¾ mg.	19 M—9½ mg.
12.5 M—6¼ mg.	16 M—8 mg.	19.5 M—9¾ mg.
13 M—6½ mg.	16.5 M—8¼ mg.	20 M—10 mg.

TUBERCULIN RUCKSTAND.

No. 1.	No. 2.	No. 4.
2 M—1/10,000 mg.	2 M—1/1,000 mg.	2 M—1/10 mg.
2.2 M—1/9,000 mg.	2.5 M—1/800 mg.	2.5 M—1/8 mg.
2.5 M—1/8,000 mg.	3.3 M—1/600 mg.	3.3 M—1/6 mg.
2.8 M—1/7,000 mg.	5 M—1/400 mg.	5 M—1/4 mg.
3.3 M—1/6,000 mg.	10 M—1/200 mg.	10 M—1/2 mg.
4 M—1/5,000 mg.		
5 M—1/4,000 mg.	No. 3.	No. 5.
6.5 M—1/3,000 mg.	2 M—1/100 mg.	2 M—1 mg.
10 M—1/2,000 mg.	2.5 M—1/80 mg.	2.5 M—1 1/4 mg.
	3.3 M—1/60 mg.	3.3 M—1 2/3 mg.
	5 M—1/40 mg.	5 M—2 1/2 mg.
	10 M—1/20 mg.	10 M—5 mg.

(J. S. T.)

HYATT, E. G., MCGUIGAN, H., and RETTIG, F. A. Action of chloral on the pupil. Jour. Pharmacol. and Exper. Ther., Vol. XV, No. 5.

Investigation was undertaken because published statements on the subject are contradictory and students give answers on examination that vary according to the schools at which they were prepared. The paper begins with a review of the mechanism of contraction of the pupil.

Barium and ergotoxine contract by direct stimulation of the circular muscle.

Eserine stimulates the third nerve endings.

Nicotine stimulates the ciliary ganglion.

Morphine removes the inhibitory effect of the cerebrum and the central ganglions of third nerve.

Strychnine stimulates the oculomotor center.

Dilatation of the pupil is due to paralysis of the circular muscle (atropine); paralysis of third nerve endings (atropine); paralysis of ciliary ganglion after primary stimulation (nicotine in large doses); stimulation of sympathetic nerve endings (epinephrin).

Frogs and mammals were used for experiment. The mammals were etherized. The carotid artery was used for recording blood pressure and the femoral vein for the injection of solutions. A tracheal cannula was inserted so that artificial respiration could be instituted promptly. Measurements of the pupil were made at the beginning and during the tests.

Conclusions.—Small doses of chloral given to produce sleep cause slight contraction of the pupil in man. This is due to removal of the inhibitory effects of the higher centers from the third nerve.

Large doses produce a pin-point pupil. The action is central, no part of the eye mechanism peripheral to the ciliary ganglion being affected. Strychnine, caffeine, atropine, and other centrally acting drugs are antagonistic to the action of chloral. Chloral poisoning is liable to be confounded with that from opium if only the pupils are considered. In differentiating the two the essential point is the condition of the reflexes. Muscular tone and reflexes are lost in poisoning by chloral; they are normal or exaggerated by opium. (J. S. T.)

NOTES AND COMMENTS.

On September 22, 1920, Commander G. A. Beall, U. S. Navy, delivered a stirring address at the Navy Department before the Assistant Secretary of the Navy, Hon. Gordon Woodbury, Admiral R. E. Coontz, Rear Admiral Thomas Washington, U. S. Navy, and about a hundred other officers on duty in the various bureaus, on the subject of recruiting.

The facts and figures presented demonstrated very clearly and forcibly the great advantages offered to the enlisted man of the Navy in the way of pay and emoluments.

Commander Beall did more than this, however. He convinced his hearers that if officers of the Navy will inform themselves of the facts, they will have sound, incontrovertible grounds for urging good men, especially petty and chief petty officers, to reenlist—arguments which they can honestly and conscientiously present to those whose enlistment has expired and who are considering how to subserve their best interests for the future. It is the duty (as well as to the best and immediate interest) of every officer and man to acquaint himself fully with what the Navy offers. Instead of sitting with folded hands talking about the low level to which the Navy is sinking through deficiency of personnel, we should awake to the fact that the enlistment contract is a unique one, differing from and guaranteeing opportunities and benefits far surpassing anything in civilian industrial life. While the average man on first enlistment gives little or no consideration to the matter of pay, this is a vital matter when enlistment expires. Up to that time—as he lives easily and well, and under no necessity of worrying over finances—the enlisted man is very apt to underestimate what he enjoys and what the Navy provides for the future, for disability and senility, and to be tempted to return to civil life by the lure of offers of seemingly larger pay and better prospects. Unfortunately many officers ignorant of the facts may at such a time give a man in whom they are interested well-meant but very unsound advice, forgetting that 16 years or more of active service and the benefits accruing from membership in the Naval Reserve assure the ex-Navy man a financial standing without parallel in civil life, inasmuch as 85 per cent of all American men alive at the age of 65 are wholly or in part dependent on private or public charity.

The following life-insurance tables are taken from data in the United States Treasury Department's textbook on Thrift and War Savings Stamps. One hundred average Americans 25 years old are selected.

Note the fact that average Americans are selected—people just like everybody in the service.

At age of—					Estates at death.
35	45	55	65	75	
5 have died. 10 are wealthy. 10 are well to do. 40 live on their earnings. 35 show no improvement.	16 have died. 1 is wealthy. 3 are well to do. 65 live on their earnings. 15 are no longer self-supporting.	20 have died. 1 is wealthy. 3 are well to do. 46 live on their earnings. 30 are not self-supporting.	36 have died. 1 is wealthy. 4 are well to do. 5 live on their earnings. 54 are not self-supporting.	63 have died. 1 is wealthy. 2 are well to do. 34 are dependent.	1 leaves wealth. 2 leave comfort. 15 leave from \$2,000 to \$10,000. 82 leave nothing.

SHEET I.

Average pay, 16 years' service, U. S. Navy.

Rates.	Number of months.	Pay per month.	Total pay each rate.	Total pay per cruise.
FIRST ENLISTMENT.				
Nonrated men:				
3d class.....	4	\$33.00	\$132.00	\$2,604.00
2d class.....	8	48.00	384.00	
1st class.....	12	54.00	468.00	
Petty officer, 3d class.....	24	60.00	1,440.00	
SECOND ENLISTMENT.				
Honorable-discharge gratuity.....			240.00	4,176.00
Petty officer:				
3d class.....	6	67.00	402.00	
2d class.....	24	79.00	1,896.00	
1st class.....	12	91.00	1,092.00	
THIRD ENLISTMENT.				
Honorable-discharge gratuity.....			364.00	6,279.76
Petty officer, 1st class.....	6	96.62	579.72	
Chief petty officer:				
Acting appointment.....	18	111.62	2,009.16	
Permanent appointment.....	24	138.62	3,326.88	
FOURTH ENLISTMENT.				
Honorable-discharge gratuity.....			544.48	7,478.96
Chief petty officer, permanent appointment..	48	144.24	6,933.52	
Total earnings for 16 years' service.....				20,537.72
Average earnings per year.....				1,296.11
Average earnings per month.....				108.01

SHEET II.

The following computation is based upon the assumption that a man enters the United States Navy at an age of 18 years, serves 16 years in the active Navy, then transfers to inactive duty in the Fleet Naval Reserve, and lives to be 65 years of age.

Note that interest upon savings is disregarded. This disregard of the interest feature is balanced, in the opinion of expert insurance and business men, by the quality of these savings in that they are not exposed to the possibilities of being spent or of being lost in due process of business or speculation by the man of average business acumen. (See insurance tables.)

Retirement is figured in the rating of chief petty officer (permanent appointment), as follows:

One-third base pay (\$126).....	\$42.00
Plus all permanent additions.....	19.06
Pay for 14 years in Fleet Naval Reserve.....per month..	61.06
Additional allowances for 30 years' service.....do.....	15.75
Pay after 14 years in Fleet Naval Reserve.....do.....	76.81

Insurance statistics show that the average Navy man will live to the age of about 68 years; that 65 years is within the average.

This man can collect—

\$61.06 for 14 years.....	\$10,258.08
\$76.81 for 17 years.....	15,669.24

Total cash he can collect (see above) after 16 years' active service..... 25,927.32

He has earned each year of his active service his right to collect one-sixteenth of this amount, or \$1,620.44, secured each year.

He has earned each month of his active service his right to collect \$135.04, secured each month.

U. S. S. ———,
Navy Yard, ———, October 11, 1920.

THE EDITOR U. S. NAVAL MEDICAL BULLETIN.

DEAR SIR: Your editorial in the October BULLETIN on the subject of special professional training for medical officers of 10 or more years service has prompted me to contribute something to the discussion of the matter in question. In the training of a naval medical officer I believe there is one large and conspicuous gap which urgently needs closing and the unfilled gap is this: That there is no provision whereby it is insured that every medical officer who goes to sea alone shall have performed, at least a few times under competent supervision, the various emergency operations which he must stand ready to perform at any time at sea when out of touch with hospital

facilities or professional assistance of any sort. Many medical officers have had practically no operative work before entering the service. This is because the medical schools do not pretend to furnish it and because a hospital internship frequently brings the resident no nearer the knife than as second or third assistant—holding retractors or handing instruments. This in the case of an interne on the “surgical side,” and the interne may have passed his whole service on the “medical side.”

After entering the service one of these medical officers is sent to sea on a small vessel and is suddenly confronted with the necessity of operating for the first time in his life on a case of strangulated hernia or a mastoiditis. He may be able to write an excellent description of these operations as gathered from a textbook, but this is a very different matter from doing them for the first time. The situation is not fair either to the patient or to the medical officer. Subsequent tours of duty may keep such a man away from surgical work indefinitely, so that the condition above described may come up years later. Captain H. C. Curl, Medical Corps, U. S. Navy, had an article in the *BULLETIN* in which he listed the operations he believed every medical officer should be ready to perform at any time. Yet, how many men are afloat to-day who have never performed these even once? Is there any other line of work in the world in which a man is expected to stand ready at all times to do unaided some difficult and dangerous task without first having had the opportunity to perform the same with skilled assistance by way of rehearsal, or, at least, to have assisted others in the same work?

It may be answered that medical officers should frequently visit hospitals and observe operations. This is true, but no amount of watching operations will begin to take the place of doing them. Acting as first assistant will come pretty close to it, but not so acting as second or third assistant or observing from an amphitheater. None of these last will ever qualify a man to operate.

Your editorial spoke of the obstacle in the way of giving special training to a medical officer caused by the fact that a relief would have to be provided during the period of training. A great deal, however, could be done without furnishing any relief by simply using to a fuller extent the opportunities we already possess. At the present time when a ship comes to a navy yard all officers, including the medical officer, are ordinarily supposed to remain aboard during office hours—till 4.30—despite the fact that a medical guard is maintained and there is little or no work to be done aboard ship. If this requirement was abolished and a medical officer was allowed to leave the ship by 9 in the morning, after holding sick call and reporting the division, he could spend the whole forenoon at some clinic or

hospital, frequently taking part in the work, at the time of day when the great bulk of the operative work is handled. This experience would be of far more value to the service than the medical officer's mere presence aboard ship during office hours. The day he has the medical guard he can devote largely to getting up any back paper work or other routine matter.

I am told that there is a distinguished surgeon in Chicago who, for a fixed fee, takes a man on for a month as his first assistant, during which time they perform together close on to 200 operations, and at the end of the time the assistant becomes the operator for a period, assisted by his instructor. Why could not such a course of intensive training in surgery be established at one of our large hospitals? A medical officer lacking the experience necessary for proper performance of emergency surgery could be ordered there for one or two months at a time, with the stipulation that for six weeks he would be first assistant to the operating surgeon, and during the last two weeks he would operate on selected cases with the assistance and under the supervision of the regular operating surgeon.

The greatest wasted opportunity I have observed in naval hospitals is the employment of a hospital corpsman as first assistant during an operation, since he can never use the experience he thus gets by operating himself, while a young medical officer is required to give the anesthetic because the surgeon is afraid to trust a hospital corpsman as anesthetist. It would be far better to regularly train hospital corpsmen to be anesthetists than to throw away the opportunities, scarce enough as they are, for young medical officers to participate in operations in the capacity of first assistant, simply because it would seem to be playing safe to have a medical officer administer the anesthetic.

Very sincerely yours,

_____.¹

Being aware of his broad and generous interest in everything that relates to the services we know that Dr. Victor C. Vaughan intended no slur on health conditions in the Navy when he stated at Rockford, Ill., before the Tri-State District Medical Society September,² 1919, that "the highest death rate in any civilized community from influenza and pneumonia was on an American man-of-war that lay in the harbor of Rio de Janeiro. It was entirely filled with recent recruits. It was an English ship or some foreign ship (I am not sure that it was English) that brought in the infection and among the eleven or twelve hundred men on this American man-of-war about 5 per cent died."

¹ Not an anonymous communication.

² Reported in Jour. Iowa State Med. Soc., Vol. X, No. 7.

Dr. Vaughan doubtless had reference to the U. S. S. *Pittsburgh* and derived his figures from tables and reports published by the Bureau of Medicine and Surgery. As far as it goes the statement is absolutely correct and it was an excellent illustration of the incontrovertible arguments he was putting forth. In view of the fact that a certain number of people jump hastily to unwarranted conclusions and that part of the aftermath of war is wholesale criticism of everything connected with the administration of military and naval affairs, we would like to deprive this class of readers and talkers of any excuse for misinterpreting Dr. Vaughan's allusion. It appears to have been made not as a criticism but as a warning. An exceptional case is cited to show what the dire results of a rapidly spreading infection may be among the susceptible. His principal concern was to show the increase of virulence of a germ propagating in susceptible hosts. We beg, therefore, to submit the following figures from official records carefully prepared in the bureau's Division of Preventive Medicine. During the period September 1 to December 31, 1918, which was the period when influenza wrought the greatest havoc in our country, the death rate from influenza and associated pneumonia on our 29 battleships was 0.73 per cent. On 21 cruisers other than the *Pittsburgh* the death rate was 0.3 per cent.

In the 23,833 men constituting the naval crews of naval transports carrying Army troops to Europe the mortality from influenza and associated pneumonia was 0.17 per cent.

If we interpret Dr. Vaughan's meaning correctly he is opposed to the herding together of young susceptible recruits in large numbers. The resultant evils of such a policy are too numerous and manifest to need any one-sided presentation of facts. Overcrowding is always bad and the overcrowding of raw recruits is always followed by disaster. Dr. Vaughan says that when recruits are called they should be "distributed among the ranks of seasoned soldiers." In the state of military unpreparedness, deliberately and persistently preferred by our country, this is impossible. All we can do is to distribute a few seasoned men among the ranks of the raw recruits. Dr. Vaughan, as a profound thinker, realizes this, and so concludes his very valuable paper by saying: "This is one of the reasons why I am so greatly hopeful that some form of universal military service will be required in order that we may get accustomed to being together and consequently become immunized; that is, that our young people may, to the respiratory diseases."

When we consider that the deep-seated hostility of our people as a whole to military preparedness and the activity of the well meaning but misguided and dangerous pacifists created a situation in which we were forced to rely almost entirely on raw recruits the

wonder is, not that the mortality in certain restricted areas was high but rather that in the Navy as a whole it was as low as it was.

Prostatic lithiasis or calculous prostatitis is discussed editorially in *American Journal of Surgery*, April, 1920. Whether the formation of prostatic stones occurs independently of local infection has not been determined, but once developed they react on the prostate causing inflammatory changes—fibrous tissue growth, even suppuration. The symptoms are similar to those of vesical calculus or vesical tumor and though variable make a diagnosis perfectly possible. Pain may be moderate, intermittent or constant and referred to perineum, testicle or groin and be aggravated at stool. Systematic examination should trace the pain to its true source. Hematuria is usually terminal and is probably produced by projection of the stone into the urethra. Dysuria, pyuria, and frequent micturition occur. Pus, free from gonococci, in prostatic fluid in an individual who has had no local infection for years is suggestive. Lumpiness and tenderness of the prostate are likewise suggestive of stone. Examination with a sound elicits a grating rather than a click. Cystourethroscopy and roentgenography are of assistance in diagnosis. Numerous small discrete shadows point to the prostate.

Dr. H. Wallace Jones, of Liverpool, reports (*Lancet*, London, Sept. 4, 1920), an interesting case of cessation of respiration 15 hours before death. A woman of 50, who had suddenly become dizzy and fallen to the ground, was brought to the Royal Infirmary unconscious and cyanosed. Respiration had ceased. The heart was beating regularly and with considerable force, 120 to the minute. Knee jerks and corneal reflexes were abolished. The pupils were equal and widely dilated. With artificial respiration color returned and the pulse dropped to 72. Artificial respiration was continued for 2 hours and during this time there was no respiratory effort. Intratracheal insufflation was maintained for 13 hours. The heart then ceased to beat. The surgical consultant advised against a decompression operation as localizing symptoms were lacking. The patient was a sufferer from chronic interstitial nephritis and general arteriosclerosis. Post-mortem examination showed a recent hemorrhage in the right cerebral hemisphere destroying the internal capsule. Both lateral ventricles were filled with blood and there was some flattening of the convolutions. The report of this case includes an electrocardiogram marked by lengthening of ventricular complex by as much as half a second.

Messrs. Gabriel Bertrand and Brocq-Rousseau, in a paper read before the Academy of Sciences, February 9, 1920, reported interesting experiments carried out to determine the effectiveness of chloropicrine for the extermination of rats. In the first series of experiments a varying amount of chloropicrine was employed per cubic meter of air space, a corresponding time elapsing before the death of the rat. The observations were repeated several times and the results reported represent a fair average.

Number of grams per cubic meter.	Average time of death.	Number of grams per cubic meter.	Average time of death.
1.....	2 hours 5 minutes.	8.....	26 minutes.
2.....	1 hour 23 minutes.	9.....	22 minutes 30 seconds.
3.....	41 minutes.	10.....	22 minutes.
4.....	39 minutes.	20.....	13 minutes.
5.....	34 minutes 30 seconds.	25.....	10 minutes 30 seconds.
6.....	27 minutes.	30.....	10 minutes.
7.....	30 minutes 30 seconds.		

In the second series of experiments the rats were placed in a chamber whose content of noxious gas was constant. The length of time each rat was subjected to the gas was noted and the time intervening before death.

Rats gassed with 10 grams of chloropicrine per cubic meter.

Length of exposure.	Time of death from beginning of experiment.	Weight (grams).	Temperature.
1 minute.....	4 hours 18 minutes.....	147	16°
2 minutes.....	4 hours 33 minutes.....	47	18°
3 minutes.....	58 minutes.....	120	16°
5 minutes.....	36 minutes.....	129	16°
7 minutes.....	1 hour 9 minutes.....	65	16°
10 minutes.....	48 minutes.....	67	15°
12 minutes.....	52 minutes.....	102	16°
15 minutes.....	28 minutes.....	72	15°

It was observed that as soon as the rats were subjected to the action of chloropicrine gas the fleas with which they were infested abandoned their hosts but died in from 3 to 15 minutes.

It seemed worthy of remark that the rats on whom these various experiments were conducted harbored the largest number of fleas in the month of August. In October the number of parasites was greatly reduced, and between December 13, 1919, and January 30, 1920, rats were found to be free from fleas.

Chloropicrine having proved decidedly toxic to rats and fleas, but without action on tissues and coloring agents, it suggests itself as available for the destruction of rats aboard ship. (Arch. de Méd. et Phar. Navales, April, 1920.)

Every medical officer in the service receives a copy of the Annual Report of the Surgeon General, but not every recipient reads it. There is a disposition to cast it aside as being merely a collection of dry figures. This is a mistake. The report gives in brief the observations of a very large number of officers, both ashore and afloat, upon details of hospital construction and management, sanitary requirements and improvements on board ship, etc., and affords the naval reader opportunity for a useful survey of a wide field of endeavor. There are medical officers who read it word for word as far as the statistical tables and their testimony is that they never fail to learn something of interest and value by so doing.

Angelo Dazzi, writing in *Policlinico*, Rome, November 30, 1919, on the diagnosis of latent malaria, states that of the various provocative agents used to bring malarial parasites into the superficial circulation hypodermic injections of adrenalin are the most effective and reliable. The dose employed is 1 milligram. This does not bring on an attack, but in 20 minutes the parasites begin to appear. They reach a maximum in an hour and completely disappear in 24 hours. Where parasites are already present the number will be increased by adrenalin, which also diminishes the size and tenderness of the malarial spleen.

W. H. Manson, of the Glasgow Eye Infirmary, writing in the *Glasgow Medical Journal*, March, 1920, states from an observation of 12,000 cases of malaria that every ague is attended by some degree of fleeting icterus of the conjunctiva. Patients who have had as many as 20 to 30 recrudescences of benign tertian fever are liable to ulceration of the cornea, best observed after applying 2 per cent fluorescein. A rare sequela of malaria is subhyaloid intraocular hemorrhage. Still less common sequelæ are paresis of the external rectus and total ophthalmoplegia. No cases of optic atrophy or toxic amblyopia occurred, but there were two cases of quinine amaurosis, only one of which recovered. Quinine had been administered in 60-grain doses daily.

Ronald Ross, writing in the *British Medical Journal*, January 24, 1920, notes that excretion of quinine seems independent of the mode of administration. Results from intravenous injection are more rapid, but not more lasting than those obtained by other methods. The actual concentration of quinine in the blood is but little greater in large than in small doses, and quinine is rapidly destroyed in the tissues, especially after large doses.

The banana is useless as an infant food in the treatment of scurvy owing to deficiency in protein and the water soluble B, accessory factor.

The University of Iowa has a well-organized student health department with a physician in charge. It was developed after correspondence with the Universities of Michigan, California, Indiana, Minnesota, and Wisconsin where the health organizations are very efficient. The staff consists of director, assistant director (both physicians), two graduate nurses, an undergraduate assistant, and a secretary. A woman physician not connected with the department is employed to examine female students. The equipment consists of examining rooms, waiting rooms, dispensary, offices, and laboratory.

A preliminary physical examination is compulsory for all students and a course of physical training for students during first and second years of study. The physical examination includes urinalysis and nose and throat cultures. The record card made for each student is an elaborate one covering family and personal history and full details regarding all vital organs, skin, teeth, feet, refraction, color perception, reflexes, etc. The physical training of each individual is modified according to the findings of the examination. Where defects are noted periodic examinations are required. Besides individual physical training and education by lectures, etc., there is sanitary supervision of boarding houses.

Beginning next year each student of the first two classes at McGill University will be required to devote two hours weekly to physical exercise in the gymnasium or on the track and on the field.

The fourth interallied conference for the study of questions relating to the disabled of the war met in Brussels, September 19-24, 1920, under the patronage of their Majesties the King and Queen of Belgium, with E. Brunet, President of the Chamber of Representatives, presiding. The subjects for discussion were; prothetic apparatus, mechanical adjuvants to labor, indemnities, reserve employments, the relation of able bodied to disabled, associations of the disabled, the tubercular disabled, etc.

In a paper read at the annual meeting of the society and subsequently published in its official organ, the Journal of the Arkansas Medical Society, Lieut. L. Humphreys, Medical Corps, U. S. Navy, gives a lively and interesting account of his experiences in the Navy

since his appointment four years ago, and sets forth the advantages and opportunities of the Medical Corps.

During his period of service the author has been on duty in the naval hospitals at Washington, D. C., and Norfolk, Va.; has cruised in the Atlantic and the Caribbean Sea, and visited the Azores, Brest, France, all the principal places of interest in the West Indies, as well as the Panama Canal, Galveston, Tex., and Savannah, Ga., Charleston, S. C., New Orleans, and Philadelphia. He compares his present duty at the navy yard, Washington, D. C., with its gun foundry and 10,000 employees, to that of a civilian physician working for an industrial corporation, and estimates the patients seen in a day at 100.

With his fondness for travel, his keen sense of humor, and his deep interest in professional work, Lieut. Humphreys appears to have enjoyed his experience of Navy life and pictures it in an attractive light. It can not be said, however, that his opportunities for pleasure or profit were in any sense exceptional. They are fairly typical of service conditions, and it may be safely affirmed that any young physician with similar tastes and a reasonable amount of adaptability would be equally satisfied with life in the Navy.

Dr. Humphreys summarizes the advantages of the Navy for medical men as follows: Opportunity for extensive travel, a broad knowledge of the field of medicine through contact with leading members of the profession, etc., regular promotion, a definite and assured income, retirement at 64 years of age with the certainty of an old age free from financial anxieties.

On and after October 1, 1920, by the recently amended Sanitary Code of New York City, it will be unlawful there to sell or possess for the purpose of sale any inaccurate clinical thermometer. The maximum permissible error is 0.2 F., and a thermometer is further deemed inaccurate if the mercury column by its own weight or for any reason other than through the application of force retreats in the tube at any point in the scale; if there are not distinctly marked gradations from 96° to 106°; if the maker's name or duly registered trade-mark is not legibly engraved on the instrument.

There have been complaints recently about the quality of the gauze on adhesive plaster furnished by the supply depots. It is important that hospital corpsmen be taught the proper method of handling adhesive plaster. When a strip is wanted the sheet may be nicked with scissors and then the desired amount is torn, roughly

torn, off. This makes it easy to detach the gauze. When plaster is cut all the way it is often impossible to grasp the gauze as there is no free edge.

R. Angus Smith, writing to Florence Nightingale, July 7, 1859, said: "It seems to me that the greatest want among nurses is *devotion*. I use the word in a very wide sense, meaning that state of mind in which the current of desire is flowing toward one high end. This does not presuppose knowledge, but it very soon attains it."

It was in the search for the secret of this devotion or rather for practical means of inspiring, developing, and regulating it that Florence Nightingale devoted so much time to the school and orphanage conducted by the ladies of the Sacred Heart on the Trinità dei Monti, Rome, during her visit to the city in the winter of 1847-48. Though thoroughly under "the obsession of Rome, which sooner or later comes upon every intelligent visitor to the Eternal City," fascinated by its art and architecture, deeply aroused by the critical political vicissitudes of the period, Miss Nightingale's most vital concern was with these philanthropic endeavors which took her later to the Crimea and made her name immortal. She studied the organization, rules, and methods of the large school, and for 10 days went into retreat in the convent. Her admiration and affection for the mother superior, Mother St. Colomba, was warm and deep.

We regret not being able to recall the source from which the following recipe was culled, but can guarantee the cookies made by this recipe to be laxative in their action and delicious enough to serve at a ladies' tea:

Bran, 6 cups (plain, from feed store).
 White flour, 3½ cups.
 Graham flour, 1 cup.
 Sugar, 2 cups.
 Lard, 2 cups.
 Milk, 2 cups.
 Finely chopped figs, ½ cup.
 Karo sirup, 1 cup.

Baking powder, 6 teaspoons.
 Cinnamon, 2 teaspoons.
 Allspice, ½ teaspoon.
 Salt, ½ teaspoon.
 Ginger, 2 teaspoons.
 Mix well; drop in pan; shape with spoon, and put in oven. Above quantities will make 125 cookies.

The Bureau of Census, Department of Commerce, has published a bulletin concerning American Samoa from which the following data are culled:

The group of South Pacific islands, known as American Samoa, lie in latitude 14° 11' to 14° 23' south and in longitude 169° 29' to 170° 52' west of Greenwich. A clearer idea of their location may

be gained from the statement that the distance from Tutuila, the largest island of the American Samoas, to San Francisco is 4,160 nautical miles; to Honolulu, 2,263 nautical miles; and to Sydney, Australia, 2,354 nautical miles.

American Samoa includes six islands, namely, Rose, Manua, Olosega, Ofu, Tutuila, and Aunuu. Rose Island is an uninhabited coral atoll. The islands of Manua, Olosega, and Ofu are generally known as the Manua Islands, and the term "Tutuila," as commonly used, includes, in addition to the island of that name, the small island of Aunuu.

Tutuila, a densely wooded and fertile island, is the largest and most important of the American Samoas. It is 18 miles long, and its greatest width is about 6 miles. Its exact area is unknown, the estimates varying from 40.2 square miles to 77 square miles. A mountain ridge extends nearly the entire length of the island. In the southwestern part there is a broad plain on which several villages are located.

Pago Pago Bay, regarded by mariners as one of the finest harbors in the South Seas, enters the south central part of the Island of Tutuila. Encircling the bay are high mountains which protect vessels anchored in the harbor from the severest storms. The United States Naval Station and the governor's residence, as well as the villages of Pago Pago, Fagatogo, Utulei, Fagaalu, Lepua, and Auaa, are situated on this bay. The harbor may be safely navigated by vessels of the largest type.

Manua, or Tau Island, is located 60 miles east of Tutuila and has an estimated area of 14 square miles. The island is very mountainous, the center having an elevation of about 2,500 feet. Tau, the largest village on Manua Island, is located on the west coast, but has no harbor. Faleasao Bay, on the extreme northwest coast, affords an excellent anchorage for vessels during the southeast trade winds.

The island of Olosega lies $3\frac{1}{2}$ miles northwest of Manua. It is separated from the island of Ofu by a narrow and shallow passage. Both of these islands are mountainous, and their combined area is about 2 square miles.

During the summer months, December to February, the temperature is highest, and during the winter months, June to August, it is coolest. The highest temperature is about 88° and the lowest about 70° . Hurricanes occasionally visit these islands. The rainy season extends from December to March, the greatest average rainfall occurring in February and the least in July.

The United States Government took formal possession of American Samoa February 19, 1900. On that date the President signed an Executive order placing these islands under the control of the

Navy Department. The Secretary of the Navy appoints the commandant of the naval station at Pago Pago, and the commandant also serves as governor of American Samoa. Beginning with 1905, the commandant has held a commission as governor, conferred upon him by the President, following his nomination by the Secretary of the Navy, and his civil powers are derived therefrom. A secretary of native affairs, acting under the direction of the governor, has jurisdiction over native affairs. The chief customs officer and other important civil officials are appointed by the governor from the naval station personnel.

Population by districts: 1900 to 1920.

Year.	Population.				
	Total.	Tutuila.			Manua district.
		Total.	Eastern district.	Western district.	
1920.....	8,056	6,185	3,777	2,408	1,871
1916.....	7,550	5,885	(¹)	(¹)	1,665
1912.....	7,251	5,454	3,186	2,268	1,797
1908.....	6,780	4,925	3,018	1,907	1,855
1903.....	5,888	4,193	2,441	1,752	1,695
1901.....	5,563	3,960	2,342	1,618	1,603
1900.....	5,679	3,923	2,221	1,702	1,756

¹ Population not separately reported.

In the population of American Samoa in 1920 there were 4,139 males and 3,917 females, a ratio of 105.7 males to 100 females, which is about the same as the sex ratio shown for the total population of the United States in 1910, 106 to 100, but is larger than the corresponding ratio for the native white population of the United States, 102.7 to 100.

Number and percentage of children attending school: 1920.

Age period.	Both sexes.			Males.			Females.		
	Total.	Attending school.		Total.	Attending school.		Total.	Attending school.	
		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.
5 to 20 years of age.....	2,911	2,034	69.9	1,510	1,104	73.1	1,401	930	66.4
5 to 9 years of age.....	1,102	742	67.3	557	386	69.3	545	356	65.3
10 to 14 years of age.....	773	693	89.7	410	374	91.2	363	319	87.9
15 to 20 years of age.....	1,036	599	57.8	543	344	63.4	493	255	51.7

There was a time in the history of the Navy when the death of an officer meant passing around the hat on behalf of his widow and children. Because of the feeling that a deceased officer's family should not be the object of the charity of shipmates and friends the Navy Mutual Aid Association came into being in 1879. It has paid out during its 41 years of existence the sum of \$2,379,000 to beneficiaries.

There are several reasons why insurance in this association should commend itself to members of the service, the principal ones being that it is safe and cheap. It is cheap insurance because all the money paid into the treasury goes to beneficiaries. The directors are officers of the Navy on the active and retired list and serve gratis. One clerk is employed and there is a small outlay for stationery, printing, and postage. Other than this there are no expenses—no commissions to agents, no rental, no advertising, no fees to medical examiners,³ no fat salaries to president, directors, and other officials.

A good many persons when invited to join the Navy Mutual Aid Association state that they object to having to pay more and more as they get older. This plan, however, is a perfectly rational and equitable one. The payments are based on actual expectation of life at any given age. The risk to the association on a given life is greater at 40 or 50 than it is at 25; hence the larger premium. The ordinary life insurance companies estimate the total amount which a man must contribute in order to compensate them for paying out the face value of the policy and divide that by the number of years he may be expected to live (adding of course for huge running expenses, etc.) to determine the fixed annual rate. In the next place promotion brings increase of pay with age, which, with the assurance of retired pay, makes it possible for those insuring in the association to be confident that they can keep up their payments.

It used to be said by critics that in the event of war the association would go to pieces. A great war is behind us and the finances of the association are in better condition than ever.

There is no delay in paying beneficiaries. As soon as the Bureau of Navigation notifies the association that one of its insured is dead the treasurer is ready to remit to the beneficiary, and will on request send up to \$1,000 by telegraph. This has often been a matter of huge convenience to the family of a deceased member.

Finally, the association engages to act as agent in presenting pension claims, securing payment from the War Risk Bureau, etc., provided the necessary affidavits are on file. As soon as one becomes a member of the association he should ascertain what papers are re-

³It has long been the excellent custom of the service for medical officers, even though they do not belong to the Navy Mutual Aid Association, to make the necessary examinations free of charge in the case of brother officers.

quired and procure and file them, as it may be a matter of some difficulty for his widow or children to obtain them 10 or 30 years later.

Admiral J. Cowie, Supply Corps, U. S. Navy, who was so successful in conducting the Liberty loan campaign in the Navy and who has done so much to help secure increases of service pay, is now the secretary and treasurer of the association. He is making strenuous efforts to increase the membership so as to bring the benefit from \$4,317.30 up to \$5,000, at the same time reducing the cost of each death assessment. On January 17, 1920, the death benefit was \$4,118; on September 4, 1920, it was \$4,317.30. During the year 1920 the membership of the association increased by 167.

The assessments for the past 17 years have averaged 24 annually. At the age of 25 the insured pays \$1.42 for each assessment; at 30 he pays \$1.64; at 40 he pays \$2.26; at 45, \$2.71; at 50, \$3.30; at 55, \$4.18; at 62, \$6.05. Assessments are paid quarterly on receipt of notification. The entrance fee is \$5 (the smallest amount other companies pay their medical examiners), which goes to the general fund.

If you want life insurance as a business investment do not consider the Navy Mutual Aid. If you want the maximum protection for your family at minimum cost join the association. If already a member secure another member, reducing your premiums and increasing the benefit. For full information address Navy Mutual Aid Association, Room 1054, Navy Department, Washington, D. C.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

DIAGNOSIS AND TREATMENT OF BRAIN INJURIES WITH AND WITHOUT FRACTURE OF THE SKULL, by *William Sharpe, M. D., professor of neurologic surgery, New York Polyclinic Medical School and Hospital, etc.* J. B. Lippincott Co., Philadelphia, Pa., 1920.

A remarkable book written in attractive, easy style and showing a perfect mastery of the subject. Particularly striking is the handling of chronic brain injuries. The numerous and well selected clinical cases described add to the value of the volume, which abounds in excellent illustrations.

THE PRINCIPLES AND PRACTICE OF MEDICINE, by the late *Sir William Osler, Bart., M. D., F. R. S., and Thomas McCrae, M. D., F. R. C. P., professor of medicine, Jefferson Medical College.* Ninth edition. D. Appleton & Co., New York, 1920.

Osler's Practice was never very satisfactory to the class of students and practitioners who resort to a textbook for specific details of treatment and for prescriptions which will cure, and in this respect the new edition revised and brought up to date by Dr. McCrae will be as unsatisfactory as ever. On the other hand, those to whom the marvelous diction—graphic, concise, simple, but elegant; the apt illustrations and quotations; the broad philosophic viewpoint made a strong appeal will rejoice at the appearance of this volume, which, while preserving undisturbed the charm and truth set forth by a magic hand that death has put to rest forever, has been brought up to date in all really essential features. Perhaps the reviser has been overconscientious and imitated the conciseness of the original author too closely. One turns to influenza expecting considerable enlargement of the presentation and is surprised to find the Pfeiffer bacillus still holding its own, while the bacillus hemolyticus is not mentioned. But it may be too early to decide positively what the recent pandemic has taught. Pellagra, beriberi, and scurvy are classed as food-deficiency diseases. The history of syphilis is given as of old, with-

out reference to the recent investigations of Sudhof. The Wassermann reaction might with propriety have received more liberal treatment. Salicylate of mercury is still preferred, for some unknown reason, to the soluble salts for intramuscular injections. Encephalitis lethargica, acidosis, trench fever, are among the subjects discussed for the first time. The description of yellow fever contains no allusion to the recent work of Noguchi. The etiology and treatment of locomotor ataxia is slightly modified and elaborated. There is some rearrangement in the classification of nervous diseases. The index has been reduced by 50 pages, so that in conjunction with thinner paper the number of pages and total bulk of the volume is considerably reduced.

The work of reediting has been done reverently, lovingly. The Osler spirit, rational, conservative, free from dogmatism, remains, and the book is perpetuated as the great classic guide in the English language to the principles, not the minutiae, of practice.

THE DUODENAL TUBE AND ITS POSSIBILITIES, by *Max Einhorn, M. D., professor of medicine, New York Postgraduate School*. W. B. Saunders Co., Philadelphia, Pa., 1920.

An illustrated monograph setting forth the uses and management of the duodenal tube devised by the author for the diagnosis and treatment of diseases of the digestive organs. The opening chapter outlines the history of modern effort to introduce a technique of precision in this field. Even the general medical reader, if he is aware of the marvelous manual dexterity, the ingenuity, the perseverance of Dr. Einhorn, can not fail to be interested in this little volume, which summarizes, with frank recognition of the limitations and difficulties of the subject, the author's labors during a long period of years.

EPIDEMIC ENCEPHALITIS, by *Frederick Tilney, M. D., Ph. D., professor of neurology, Columbia University*, and *Hubert S. Howe, A. M., M. D., instructor in neurology, Columbia University*. Paul B. Hoeber, New York, N. Y., 1920.

After a summary of the leading characteristics of the disease, the eight types into which the authors divide its manifestations are illustrated by appropriate and elaborate discussion of clinical cases. Chapters IX to XIII analyze the symptoms and course of encephalitis, the prognosis, diagnosis, and treatment. The authors regard encephalitis as an infectious and probably communicable disease. Part II is devoted to a discussion of selected cases. The book is profusely illustrated to show pathological findings, temperature curves, typical attitudes, and facies. A distinct defect is the absence of an index.

MODERN DENTISTRY, by *Joseph Head, M. D., D. D. S., dentist to the Jefferson Hospital, Philadelphia, Pa.* Second edition. W. B. Saunders Co., Philadelphia, Pa., 1920.

An interesting, simply written book giving the results of many years of careful research and experiment, and calculated to be of real help to the dental surgeon. It is richly illustrated and contains a valuable series of tables showing the results of experiments with various types of cement.

THE PRINCIPLES AND PRACTICE OF DERMATOLOGY, by *William Allen Pusey, A. M., M. D., professor of dermatology, University of Illinois (emeritus).* Third edition. D. Appleton & Co., New York, 1917.

An ideal book for the general practitioner who must frequently treat the commoner skin diseases, and should always be in a position to refer to higher authority cases of the rarer or more serious types. Dr. Pusey writes good English, a not too frequent characteristic of American medical works, and has shown excellent judgment in apportioning space to various subdivisions—treatment, diagnosis, etc.—under each topic. Nearly 200 pages are devoted to syphilis. We deprecate the positive statements under “history” of syphilis, but differences of opinion in this regard do not affect the merit of the book as a whole. The illustrations, largely from the author’s collection, are very good.

GEORGE MILLER STERNBERG, A BIOGRAPHY, by *Martha L. Sternberg.* American Medical Association, Chicago, 1920.

A very well written account of the life of G. M. Sternberg, who was Surgeon General, U. S. Army, from 1893 to 1902. Dr. Sternberg while at the head of the Medical Department worked with zeal to improve the medical service of the United States Army. He founded the Army Medical School, the Dental Corps and Nurse Corps, the tuberculosis sanitarium at Fort Bayard, N. Mex., and other Army hospitals. He was an earnest student of bacteriology and by his example and authority gave a great stimulus to researches in this field in our country. Dr. Sternberg had a severe attack of yellow fever in 1875, but his interest in this disease antedated his own personal experience of it and continued throughout life. In May, 1900, he designated the members of the Yellow Fever Board, whose labors resulted in the epoch-making determination of the etiological factors of the disease, or so much of them as permit instituting rational measures for its systematic prevention. Sternberg was a methodical, painstaking, conscientious worker, and he continued to labor for the good of the country after retirement from public office. He received many merited honors both at home and abroad, among them the presidency of the American Medical Association.

17908—20—18

PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE, by J. J. R. Macleod, M. B. professor of physiology, University of Toronto, R. G. Pearce, A. C. Redfield, N. B. Taylor, and others. Third edition. C. V. Mosby Co., St. Louis, Mo., 1920.

A brief review of the first edition of this work appeared in these columns at the proper time. It was written by a chemist and physiologist and was extremely conservative. We hold that the demand for a yearly reissue of a work of this type which retails at \$10 a volume is very fair evidence that its merits are recognized by the reading portion of the medical profession. For this, the third edition, much of the material has been recast and several topics are covered for the first time.

From an avowedly cursory examination made on the eve of going to press, the writer, who disclaims any qualification for delivering an expert opinion, unhesitatingly recommends the work to all those who, like himself, find the vocabulary of medicine constantly increased by terms not wholly intelligible because of the constant advances in chemistry and physiology and who can not get a clear comprehension of them from desultory reading in the current literature. For all those who became actively engaged in the strictly practical exercise of medicine before electrocardiogram, acidosis, hydrogen-ion concentration, the endocrine organs, etc., had entered into every-day parlance, the book seems a treasure house of information.

It is far from a discredit to the work in question that in many of the discussions a final pronunciamiento is lacking. The writers have been positive only where exhaustive experiment justified assertion; they have written with reserve and brevity on subjects that remain to be fully exploited.

In clearness of diction, despite the intricacies of the subject, and in such material features as illustrations, paper, type, etc., the book reflects credit on authors and publisher alike.

SANITY IN SEX, by William J. Fielding. Dodd, Mead & Co., New York, 1920.

An interesting volume written with the frankness and intransigent spirit which characterizes modern discussion of sex topics, for this is one of the fields in which apparently people must occupy extreme ground. The author's frankness is most conspicuous in the chapter on "Conjugal happiness," the best in the book. Other chapters of unquestionable merit are "Sex education," "Sex ignorance," and "Instruction in the public schools."

The introduction and the chapter styled "Fig-leaf morality" discuss the past and present attitude of public sentiment toward sexual matters. Here, as throughout the book, there is unreserved condemnation of everything that has gone before. The survey of Gov-

ernment effort for the suppression of venereal disease is of stirring interest. Historical completeness would have justified some reference to the continuous, systematic work of the Navy for 17 years past, but Mr. Fielding is modern to a degree. He thoroughly discredits poor Malthus because "as a clergyman" he was not likely to have "a very thorough understanding of sex psychology or the reproductive instinct." We can not speak as to the psychology, but even before Anthony Trollope described the Rev. Quiverful, churchmen gave every evidence that they were not lacking in the sex instinct. Malthus recommended "ascetic self-restraint" for birth control, but this, while preached in our antivice crusades for the unmarried, is scorned by the new propaganda, which sees no call for restraint in those legally joined together.

The whole handling of the subject of birth control and the "new morality" is characterized by special pleading, scorn of other people's views, and a dogmatism which savors of the medieval inquisitor. The book is dedicated to boys and girls and the young men and women of the rising generation, but we should consider it a pernicious one to place in the hands of the immature who rarely have the faculty of detecting defects in a line of reasoning but swallow whole what they read in print. To qualify those who agree with us as competent judges and those who differ as lacking in intelligence; to set forth large claims and lightly assume that they are proved; to give incomplete and inconclusive statistics interpreted to suit the argument; to make sweeping assertions does not comport with the scientific attitude claimed by the writer. In quoting a contemporary clergyman to the effect that "birth control is the only means of preventing the alarming increase of pauperism, sickness, crime, and immorality," Mr. Fielding apparently indorses this remarkable statement. The hope of a universal remedy for all the ills of society seems as unscientific as a belief in a panacea for physical ailments, but such hopes are at least sustaining to those who harbor them.

"Unrestrained human breeding can not go on indefinitely." The young reader is not likely to challenge this positive statement of opinion rather than fact nor to ask himself if it is not equally or more true that birth control can not go on indefinitely. As medical men we bow to the complimentary assertion that "pestilence which in more primitive times used to sweep off whole sections of population has been conquered by science," but blush to recall the futility of our efforts to check the recent pandemic of influenza which relieved the world of an inconsiderable trifle of 6,000,000 inhabitants. In 1918, for the registration of the United States, there were reported 477,467 deaths from influenza and pneumonia, 380,996 of them occurring in four months. This may not be a pestilence, as Fielding understands the term, despite its decimating effects, so we

offer tuberculosis, infantile paralysis, bubonic plague, typhus, and cholera as examples of yet unconquered enemies of the race.

Mr. Fielding also opines that wars will cease (the wish being father to the thought), and that if they cease we must provide ourselves with some other way of keeping down the population. As there has not been a really great war since as far back as 1918, the necessity for haste in devising a birth-rate reducer is manifest.

But opinions and beliefs, however sincere, are not scientific demonstrations. Holland is cited as the best illustration of the blessings of birth control, and we are informed that since 1881 the death rate and infantile mortality rate have become the lowest in Europe, thanks to the "new morality," the author's synonym for birth control. This is the post hoc ergo propter hoc variety of argument. That the fall in death and mortality rates is due to birth control can not be accepted on the mere statement of a Fielding or even a Sanger. Eighteen years is a very short period for the observation and deduction of anything connected with biology and physical development. We are told that in this period there has been 100 per cent increase in the number of men averaging 5 feet 7 inches height and a decrease of 66 per cent in those under 5 feet 2½ inches. This is certainly a startlingly rapid consequence of birth control—so rapid, in fact, that we wonder how the scientific spirit and "intelligent understanding" of the neomalthusians can accept it. It suggests the old but sound nursery axiom, "too good to be true."

As a general proposition it may be safely affirmed that in the vast majority of cases the difficulty of an undertaking is in some degree proportionate to the importance and value of its results; that the things too easily accomplished are not going to be rewarded by vast benefits. If, as intimated, the distribution of a penny pamphlet describing contraceptive measures is going to cure poverty and distress, then one of the incidental benefits of birth control will be the reduction of the high cost of living by giving an enormous increase to the purchasing power of money. What we would like Mr. Fielding to tell us is not that "tranquillity" and "comfort" will be secured to the parents of fewer children (which we are inclined to concede), but how birth control will affect character. We would like to know whether tranquillity and ease make for development; whether the bearing of burdens, the toil and self-sacrifice endured for the sake of one's children is a good thing; whether ambition, work, and enterprise are fostered by the necessity of providing for these children; and, if so, what great motive force he proposes to substitute for them?

Nature, so often invoked by the followers of the new morality, cares little for the individual and everything for the race. In the proposition which Mr. Fielding sets out to prove there is a curious

juxtaposition of the words "individual" and "social." We will not be so lacking in liberality as to declare him guilty of confounding individual and social advantages, but we confess to the conviction that a large proportion of those practicing birth control are thinking only of their own individual interests. One of the great bulwarks of the new morality is the delightful fact that persons may boldly and unblushingly do things for selfish purposes under the guise of public service. Viewed from the standpoint of society at large, we consider the public interests very seriously prejudiced by the reduction of the birth rate among the well-to-do. The benighted reviewer feels that if birth control could lead to an increase in the progeny of the well-to-do while restricting the philoprogenitiveness of the needy it would have at least a strong title to consideration, but so far it appears only to have reduced the number of children who can be brought up with every advantage and be properly launched in life. This fact is rarely dealt with by the champions of birth control, but it should certainly receive their earnest attention, for as long as birth control reduces the number of "well born, well cared for, and well educated children" it seems an unsocial measure.

It is a matter for serious consideration by those who are interested in the greatest good to the greatest number whether the advantage of checking propagation among the poor offsets the serious consequences of birth control among the well-to-do, and in the class of the well-to-do must be included, be it understood, those who are perfectly able to feed, clothe, and educate a numerous brood provided they will practice self-denial and thrift and be willing to endure even privation and hardship.

THE SCHOOL OF SALERNUM, REGIMEN SANITATIS SALERNITANUM, THE ENGLISH VERSION, by *Sir John Harrington*; HISTORY OF THE SCHOOL OF SALERNUM, by *Francis R. Packard, M. D.*; NOTE ON THE PREHISTORY OF THE REGIMEN SANITATIS, by *Fielding H. Garrison, M. D.* Paul B. Hoeber, New York, 1920.

An attractive volume fully on a par with other historical issues from the press of its book-loving publisher. The pleasing portrait of the Elizabethan gallant who translated the Regimen, other quaint illustrations, the paper, the binding, combine to give this little work all the charm of a holiday edition. We suggest it as an appropriate New Year's gift from one physician to another.

Dr. Packard tells the story of the first European medical school in a simple, straightforward way and we rejoice to note that he follows De Renzi, not Malgaigne, regarding the reality of a Trotula. It was the magic of her name fastened to pill and potion that gave ready sale to the wares of many a peddler throughout the Middle Ages. We are still hoping that some philologist will establish the

undoubted identity of Trotula, Madame Trot, with the Dame Trot of our Mother Goose melodies.

Dr. Garrison writes entertainingly of Salerno's part in the composite Greek and Arabic influence that played on medicine in the pre-Renaissance period. He confirms De Renzi's postulate that the *Civitas Hippocratica* was a lay institution and sets forth Sudhoff's ideas regarding the original model of the Regimen.

Next comes a facsimile of Harington's translation of the first 20 verses, then the version itself, the Latin text, notes on the version, which greatly enhance its interest for the ordinary reader, notes on the text and an index.

Typographical errors are few. It is only in the interest of subsequent editions that we note those on pages 24, 34, and 50 (2).

PRACTICAL BACTERIOLOGY, BLOOD-WORK AND ANIMAL PARASITOLOGY, by E. R. Stitt, A. B., Ph. G., Sc. D., LL. D., Rear Admiral, Medical Corps, U. S. Navy, commanding officer and head of Department of Tropical Medicine, U. S. Naval Medical School, Washington, D. C. Sixth edition. P. Blakiston's Son & Co., Philadelphia, Pa., 1920.

Teachers and students alike will welcome a new edition of this popular work enriched by many new illustrations and 70 additional pages of text. The general presentation of the subject has been made more systematic by a regrouping of various organisms as shown in the handling of the typhoid-colon group.

The discussion of blood flukes has been elaborated. The subject of blood chemistry has been entirely rewritten. Other new material covers the work of Noguchi in yellow fever and his discovery of the *Leptospira icteroides*.

The alphabetical index of laboratory procedures required for the diagnosis of each individual disease is a feature that will prove of very material help to the practitioner.



Sci 3320

VOL. XV

NO. 2

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
CAPTAIN J. S. TAYLOR, MEDICAL CORPS, U. S. NAVY
IN CHARGE

APRIL, 1921

(QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

Harvard College Library
May 25, 1921
From
United States Government

NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 3, July, 1918.

SUBSCRIPTION PRICE OF THE BULLETIN.

Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C.

Yearly subscription, beginning January 1, \$1; for foreign subscription add 25 cents for postage.

Single numbers, domestic, 25 cents; foreign, 31 cents, which includes foreign postage.

Exchange of publications will be extended to medical and scientific organizations, societies, laboratories, and journals. Communications on this subject should be addressed to the Surgeon General, United States Navy, Washington, D. C.

TABLE OF CONTENTS.

	Page.
PREFACE.....	VII
NOTICE TO SERVICE CONTRIBUTORS.....	VIII
SPECIAL ARTICLES:	
TREATMENT OF INFLUENZA.	
By Commander J. L. Neilson, Medical Corps, U. S. N.....	259
INTRAVENOUS USE OF MAGNESIUM SULPHATE IN INFLUENZAL PNEUMONIA.	
By Lieutenant J. J. Hogan, Medical Corps, U. S. N. R. F.....	277
ACCIDENTAL INJURIES FROM ELECTRIC CURRENTS.	
By Commander W. J. Zalesky and Lieutenant W. T. Brown, Medical Corps, U. S. N.....	279
METHODS OF STERILIZATION IN DENTISTRY.	
By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N....	282
PEPTIC ULCER.	
By Lieutenant C. S. Norburn, Medical Corps, U. S. N.....	285
SURVEY OF FIFTY COURT-MARTIAL PRISONERS.	
By Lieutenant C. H. Castle, Medical Corps, U. S. N. R. F.....	291
HOSPITAL TRAINING OF APPRENTICES.	
By Lieutenant A. H. Ehrenclou, Medical Corps, U. S. N.....	296
METHODS OF INSTRUCTING HOSPITAL CORPSMEN.	
By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N....	302
STANDARDIZING TREATMENT FOR VENEREAL DISEASE.	
By Lieutenant Commander W. D. Owens, Medical Corps, U. S. N.....	308
PLAN OF ORGANIZATION FOR A NAVAL HOSPITAL.	
By Captain R. P. Crandall and Commander W. A. Angwin, Medical Corps, U. S. N.....	316
HISTORICAL:	
SURGERY IN THE MIDDLE AGES.	
By Captain J. S. Taylor, Medical Corps, U. S. N.....	347
EDITORIAL:	
CALLING A SPADE AN IMPLEMENT OF HORTICULTURAL UTILITY.....	377
"TO RIDE THE HOBBYHORSE WITH THE BOYS".....	378
SUGGESTED DEVICES:	
RETINOSCOPIC LENS HOLDER.	
By Captain J. S. Taylor, Medical Corps, U. S. N.....	383
STRONG ROOM FOR ALCOHOL AND NARCOTICS.	
By Captain A. Farenholt, Medical Corps, U. S. N.....	385
DETECTION OF MOSQUITO LARVAE.	
By Lieutenant Commander J. C. Parham, Medical Corps, U. S. N.....	386

CLINICAL NOTES:	Page.
TUBERCULOUS MENINGITIS SIMULATING LETHARGIC ENCEPHALITIS.	
By Lieutenant Commander W. A. Bloedorn, Medical Corps, U. S. N.....	387
ADVANCEMENT OF OCULAR MUSCLES BY THE FOX TECHNIQUE.	
By Lieutenant Commander C. B. Camerer, Medical Corps, U. S. N.....	392
SURGICAL TREATMENT OF "SADDLE NOSE" DEFORMITY.	
By Lieutenant Commander C. B. Camerer, Medical Corps, U. S. N.....	397
A HAND PLASTIC.	
By Lieutenant Commander Lucius W. Johnson, Medical Corps, U. S. N.....	399
DISLOCATION OF FIRST CERVICAL VERTEBRA.	
By Captain G. T. Smith, Medical Corps, U. S. N.....	400
DEATH FROM NEO-ARSPHENAMINE.	
By Commander W. J. Zalesky and Lieutenant J. E. Bellinger, Medical Corps, U. S. N.....	401
THROMBOSIS OF THE LATERAL SINUS.	
By Lieutenant Commander E. E. Koebbe, Medical Corps, U. S. N.....	403
ORCHITIS COMPLICATING TONSILLITIS.	
By Lieutenants J. D. Benjamin and T. C. Quirk, Medical Corps, U. S. N.....	406
OPERATIONS FOR TRAUMA OF THE URETHRA.	
By Lieutenant W. L. Cowles, Medical Corps, U. S. N. R. F.....	407
SEA SICKNESS.	
By Commander C. E. Henry, Medical Corps, U. S. N. R. F.....	410
TREATMENT OF THE "WEST INDIAN CHANCROID."	
By Lieutenant Commander W. H. Michael, Medical Corps, U. S. N.....	412
PROGRESS IN MEDICAL SCIENCES:	
GENERAL MEDICINE. —The arsphenamines in therapeutics.—Rectal absorption of glucose.....	415
MENTAL AND NERVOUS DISEASES. —Lethargic encephalitis.—Theory of hysteria.—Mental deficiency.....	420
SURGERY. —Resuscitation in death under anesthesia.—Advances in anesthesia.—Sloughing in local anesthesia.—Anesthesia in abdominal surgery.—Suppurating wounds after abdominal section.—Saving suppurating incisions.—Abdominal adhesions.—Perforating gastric and duodenal ulcer.—Persistence of pyloric and duodenal ulcers.—Diverticula of the duodenum.—Orthopedic treatment of burns.—Postoperative bronchial irritation.—Care of surgical patients.—End-to-end anastomosis.—Genital tuberculosis.—Radium therapy of cancer of bladder.—Radium and malignant genito-urinary disease.—Bone tumors.—Fracture of vertebrae.—Penetrating wounds of chest.—Operation for empyema.—Plastic war surgery in civil life.—The war's contribution to civil surgery.....	429
HYGIENE AND SANITATION. —Typhus fever in Serbia.....	455
PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY. —Diagnosis of cholera.—Staining malarial parasites.—Saprophytism of venereal organisms.—Variation in size of red cells.—Anophelines of California.—Reaction from echinococcus fluid.....	457
EYE, EAR, NOSE, AND THROAT. —Encephalitis lethargica.....	467

TABLE OF CONTENTS.

V

NOTES AND COMMENTS:

Page.

Bronchospirochaetosis.—Starvation edema.—Dried cabbage as an antiscorbutic.—Miner's nystagmus.—Endocrines and the teeth.—Orientation of bats.—Sugar production.—The teeth of the ancient Egyptians.—Treatment of enlarged thymus.—Plague in Paris.—Antivenereal campaign in Rouen.—Medical school of the University of Virginia.—Postgraduate study in the Japanese Navy.—National Academy of Science.—Peking Union Medical College.—The dye industry.—Naval medical service as a career.—Naval dispensary and hospital defined.—Death of Anton Weichselbaum.—Action of the Women's Civic League, Malden, Mass.—Dr. Russel H. Boggs.—Preservation of leather.—Service publications.—Picric acid.....

469

REPORTS:

SEWAGE SYSTEM IN CHARLOTTE AMALIA.

By Lieutenant R. L. Pettigrew, Civil Engineer Corps, U. S. N., and Lieutenant E. Peterson, Medical Corps, U. S. N.....

481

APPLICATION OF THE SCHICK REACTION TO 2,911 NAVAL RECRUITS.

By Lieutenant B. F. Norwood, Medical Corps, U. S. N.....

485

SMALLPOX IN HAITI.

By Lieutenant Commander K. C. Melhorn, Medical Corps, U. S. N.....

492

SANITARY REPORT ON LIBAU, LATVIA.

By Lieutenant Commander A. C. Smith and Lieutenant R. P. Parsons, Medical Corps, U. S. N.....

492

SUMMER SCHOOL, HAMPTON ROADS, VA.

By Lieutenant Commander K. E. Lowman, Medical Corps, U. S. N.....

495

INFORMATION WANTED

498

BOOK NOTICES.....

499

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

E. R. STITT,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margin are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterhead, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All material supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XV.

APRIL, 1921.

No. 2.

SPECIAL ARTICLES.

TREATMENT OF INFLUENZA.¹

By J. L. NEILSON, Commander, Medical Corps, United States Navy.

When the warning reached this station that an epidemic of influenza was approaching the prospect was alarming. The station consisted of a large industrial plant and a concentration and training station for military forces, both enterprises at the time running on the high plane of war activity with an average daily complement of 16,468 persons. As a concentration and training camp, the station was particularly vulnerable, and as an industrial plant it was rendered so by the tremendous overcrowding that existed in the adjacent city where the workmen lived. The problem of preparing to meet the blow, to reduce morbidity and mortality, and keep the urgent war work of training and construction at a high rate of speed was a large one.

The purpose of this report is to present some interesting facts bearing on the treatment of developed cases. To discuss preventive measures and the hygienic conduct of the situation would require too much space and obscure the real aim of the report. The epidemic at Mare Island, Calif., began October 4, 1918, and died out about November 25, 1918.

On the night of September 26 a conference of medical officers was held to discuss the subject of treatment. The general therapeutic measures required were accepted as being rest, catharsis, proper diet, and careful nursing. Telegraphic communication with eastern authorities then in the midst of the disease yielded no message even pointing to a specific form of treatment. No vaccine either for prophylaxis or treatment was considered of the least value; sodium salicylate, aspirin, etc., were still being used by mouth, as of yore, with small satisfaction. All cases were considered potential pneumonias and were receiving the usual therapeutic measures, including stimulation by mouth or hypodermic.

The information gained from articles already appearing in medical journals offered nothing further and textbooks were equally vague.

¹ Extracts from a report with special reference to treatment of an epidemic of acute respiratory infection—"Influenza"—which occurred at the United States Naval Station, Mare Island, Calif., September–November, 1918.

One fact stood out above all others in the information obtained, namely, that this disease was one of tremendous virulence, far beyond any influenza of former days. The consensus of opinion was that sodium salicylate was the best drug to be used, but the usual difficulty was to get a large enough dose into the patient without poisonous symptoms.

During the conference, Lieutenant J. J. Hogan, Medical Corps, United States Naval Reserve Force, suggested the use of sodium salicylate intravenously in sterile solution as the best method of exhibiting the drug. He based his opinion upon his previous research work in intravenous use of this and other drugs and his practical and successful use of sodium salicylate in the acute infections of rheumatism and tonsillitis. Proof was offered of the freedom from danger in using certain drugs intravenously (1) (2) and of this drug in particular, and the use of sodium salicylate intravenously was adopted as being the best form of drug treatment then available. Thorough alkalization and a diet high in carbohydrates were considered essential features of the treatment.

Steps were at once taken to procure special equipment with which to carry out the intravenous method, and the following outline of treatment was issued with the directions that it should be followed (with due consideration for individual cases) until such time as developments, experience, or further information should lead to a change. In addition, the usual baths, pneumonia jackets, alcohol rubs, ice caps, etc., were to be used.

OUTLINE OF TREATMENT FOR INFLUENZA CASES.

1. Give intravenous injection of sodium salicylate 5 gms. in 10 c. c. distilled water. If any toxic symptoms of an alarming nature appear, give 250 c. c. of 4 per cent soda bicarbonate intravenously. The salicylate mixture should be prepared fresh each day: 50 grams salicylate soda placed in flasks and brought up to 100 c. c. with fresh distilled water and boiled makes it ready for use.

2. Cases should be controlled by urinary examinations and blood counts before and after treatment. The urinary examination should consist of determining the acidity of urine with methyl red paper. Examination for albumen and casts should also be made. To determine if there is an upset in carbohydrate metabolism also examine for acetic and diacetic acid. Complete blood count should be made before the intravenous use of the salicylate and six hours after.

3. The urine should be kept alkaline to methyl red. This can be done by giving the patient a teaspoonful of the following mixture every three hours. Give it until urine becomes alkaline and keep it so:

Soda bicarbonate.....	100
Magnesi oxidl pond. (heavy calcined).....	25
Calcil carbonas precip.....	25

4. Patient should have at least 500 grams of carbohydrates daily. This may be divided between milk, malted milk, cereals, the various sugars, ice cream,

and alcohol if necessary. Eggnogs to be made with sugar, canned milk, and enough alcohol to disguise flavor.

5. Control cough with codeine and heroin. Control restlessness by liberal use of opiates.

At the outbreak of the epidemic in the first unit, the emergency hospitals planned were put into operation. They were three in number: One at the naval training camp, one at the marine barracks, and one in the navy yard. The latter was to provide for serious cases among Federal civilian employees who were unable to receive food and nursing care in the rooming houses, tents, or shacks in which they lived. In addition to these emergency hospitals, there existed on the station a fully equipped base hospital. Later, when the city of Vallejo was attacked, the Navy established an emergency hospital in that town. It was in these five hospitals that the cases on which this report is based were treated.

The emergency hospitals at the naval training camp and marine barracks consisted of large, temporary barrack buildings with tent extensions. The emergency hospital in the navy yard occupied a large concrete building which was about completed for use as a medical supply depot. A tent extension was set up in connection with this building also. The emergency hospital in Vallejo was established in a large concrete school building of recent construction. The portion of the base hospital used for influenza cases consisted of recently finished semipermanent hospital buildings with a tent extension.

At each of the emergency hospitals subdivisions were established as follows:

Admission ward: Subdivided for (a) low temperatures; (b) high temperatures.

Influenza ward: With subdivisions for (a) suspected pneumonias; (b) nose and ear complications.

Pneumonia ward: Pneumonias largely treated in tents.

Convalescent ward: Almost invariably tent colonies.

These hospitals were equipped and provided with all the essentials for the care of patients.

In the emergency hospital at the naval training camp 718 cases were treated throughout the course of their illness and 114 cases were treated part of the time and later transferred to the base hospital. This hospital was in operation from October 6 to October 31, 1918, and handled men only.

In the civilian emergency hospital in the navy yard, 283 cases were treated throughout the course of their disease, none being transferred to the base hospital. This hospital was in operation from October 7 to November 30, 1918, and handled men only.

In the civilian emergency hospital in Vallejo, 133 cases were treated throughout the course of their disease. None were transferred to the base hospital. This hospital was in operation from November 2 to November 30, 1918, and handled men, women, and children.

At the base hospital, 615 cases from the navy yard, naval training camp, marine barracks, and naval prison were treated throughout the course of their illness. Also at this hospital 116 cases (already mentioned above) were cared for who had been treated for part of their illness in the emergency hospitals either at the training camp or marine barracks. This hospital handled mostly men but some women were treated who were admitted from among the yeoman (F.) attached to the navy yard.

The naval training camp was the first group of personnel infected, and the disease, of a severe type, starting on October 6, spread like wild fire, reaching the height of admissions on the 13th and rapidly fading away to a few cases by the 22d. During this period the temporary hospital at the camp handled a total of 800 men, including suspects. The highest admission rate for any one day was 110 and the greatest number of cases in the hospital on any one day was 450.

The epidemic among the marine personnel showed two distinct waves, one produced by infection among men under training, and the other among men performing straight duties. During the first wave 100 patients were handled in the emergency hospital.

The greatest number under treatment on any one day was 51. This hospital was closed before the second wave started, so all men of the second wave were treated in the base hospital.

The second wave (that among men under training) lasted from November 4 to December 12, the largest number admitted between November 4 and November 25. Arriving recruits gave rise to the bulk of cases. Most of them were infected prior to their arrival. It is interesting to note that out of 309 cases among marine personnel, 238 (77.1 per cent) were recruits at the depot less than 21 days and of the remainder, 71 (22.9 per cent) several were men who were closely associated with the recruits as instructors, etc.

Very early in the epidemic it was found that the alkaline drink prescribed in the outline of treatment could not be taken by patients except in limited quantities and for a brief period of time, as the taste could not be disguised sufficiently for it to remain palatable, and large quantities of the alkaline drink were absolutely necessary. For this was substituted an aerated water, known to the medical officer as an active antacid, which could be readily obtained from the manufacturer in Vallejo, and arrangements were made to procure this water in sufficient quantities. The manufacturer of this water patriotically donated large quantities free of charge, and it was

found that by mixing it with lemon, orange, or grapefruit juice patients could take several quarts a day without developing the slightest distaste and at the same time be kept well alkalized and have thirst relieved. Magnesium sulphate was used to produce catharsis.

It was unfortunate that the most severe epidemic in any group should have been the first, so that little time could be spared for scientific research or comparison, but a rough comparison between the results of treatment by mouth and treatment by intravenous method was possible by dividing in half the patients in each ward, treating one group by mouth and the other intravenously. In a very brief space of time it was apparent that in general those treated intravenously were better off than those treated by mouth, other things being equal, and it was soon determined to use the intravenous treatment in all cases where temperature persisted above 102.5 for 36 hours.

SODIUM SALICYLATE, INTRAVENOUSLY.

In the beginning it was hoped that the practical use of sodium salicylate, intravenously, would bear out the findings of scientific researches in pharmacology which show that the nontoxic sodium salicylate circulates in the blood as such unless it comes in contact with a degree of acidity sufficient to change it to salicylic acid (3). Such high acidity is found in inflamed and edematous tissues as a result of accumulation of large amounts of CO_2 , and therefore at these points it was hoped that salicylic acid would become available and have direct influence upon the inflamed and edematous areas. It is possible that some such effect was produced, but it was soon demonstrated that certainly the greater value of sodium salicylate in the doses administered was the immediate relief of pain and restlessness without the slightest evidences of salicylic-acid poisoning and without the grave depression, drenching sweats, and lowered blood pressure which followed the use of aspirin.

It was observed that in cases which were initially very severe, aspirin would temporarily relieve pain and reduce temperature but the drain on the individual appeared to reduce his power of resistance to the disease and temperature and pain rapidly returned after the effects of the drug passed off. The relief from pain and restlessness and the return of the patient to a bright and happy frame of mind which invariably followed the use of sodium salicylate, intravenously, was remarkable, and even if the disease progressed in severity, the period of freedom from the extreme toxemia placed the individual in a more favorable position to combat the disease.

In the administration of the sodium salicylate intravenously it was found that vomiting occurred in a large percentage of cases starting within a minute after the administration of the drug and

continuing for from 5 to 10 minutes; also there was some pain at the seat of the injection. These symptoms were transient and were largely counteracted by greater dilution (using 20 c. c. of distilled water instead of 10) and by adding a small amount of sodium bicarbonate. It would be logical to assume that even greater dilution would be still better, and now looking back upon the early experiences it would appear that dilutions of 200 c. c. given as perfusion would be better than the more concentrated solutions given by injection. A few cases developed a small slough at the site of injection, which healed rapidly and was no doubt due to a small amount of the solution gaining access to the tissues outside the vein. In a few of the early cases vein irritation was noticed, a little soreness indicating this condition; but in only one case did thrombosis result, and in this one case the cause was questionable, as no sign of the condition appeared until two weeks after the injection (according to the history given by the patient). The case was not seen by a medical officer until one month after the injection, the patient in the meantime having left the navy yard for special duty at the naval training station, San Pedro, Calif.

In view of the good effects of sodium salicylate used intravenously with proper precautions as to dilution and sterility, its freedom from danger, and the poisonous symptoms so frequently encountered when administered by mouth, and its freedom from the bad effects produced by aspirin, it was thought that sodium salicylate by intravenous method was the best symptomatic treatment in the early stages.

MAGNESIUM SULPHATE, INTRAVENOUSLY.

It was soon found that sodium salicylate, as above stated, was largely a symptomatic treatment, as in a certain percentage of cases temperature remained up or returned after the initial drop and the disease progressed to more serious stages, namely, to the so-called pneumonias, with the now well-known symptom of marked cyanosis.

Autopsies performed at this time showed that, certainly in most of these so-called pneumonias, death was produced not so much by an inflammatory process as by lung edema. As a result of Lieutenant Hogan's recommendation the intravenous use of magnesium sulphate was instituted on the principle that it was the most active, safe dehydrator of living tissues known (4) and through this an active combatant of streptococcic infection, as by relieving the edema more oxygen reached the part and this higher oxygen content was less favorable to growth of streptococci, which organism is known to thrive best in low percentage of oxygen.

These scientific principles had been put to practical use in streptococcic wound infections (associated with great edema) among navy

yard workmen just prior to the advent of influenza with excellent results and without unfavorable symptoms. In these cases magnesium sulphate was used intravenously and it was observed that there was a marked and rapid reduction of edema, relief from pain, great increase in urinary secretion and diminution in toxic symptoms.

The employment of this drug at times produced very marked results and it was found that the earlier it was used in a case which had begun to show signs of cyanosis, the better. Associated with its use there was a slight rise in the leucocyte count and marked improvement of the general condition of the patient and apparently it also had a beneficial effect upon the brain symptoms (which were those of edema) as the mentality of the patient cleared in a remarkably short time after the injection. Still later in the progress of the epidemic, it was found that better results were obtained in the use of the magnesium sulphate if a certain amount of bleeding was permitted through the small caliber needle, 19 or 21 gauge, before injection was started and once or twice during the progress of the injection; and where bleeding was not considered to be sufficiently profuse through the needle, the vein was opened on the opposite arm. It was found absolutely essential to give the injection slowly, devoting at least one-half hour to administration, otherwise the patient complained of a burning, tingling sensation all over.

By about October 20, the following directions had been formulated for the use of the sodium salicylate and the magnesium sulphate.

DIRECTIONS FOR TREATMENT OF INFLUENZA AND PNEUMONIA.

Keep patients in bed under observation for 12 hours unless they are extremely sick and have high temperature when you first see them. If temperature does not drop in 12 hours, give sodium salicylate, 5 grams, intravenously. In the majority of cases, temperature keeps up for more than 48 hours and is ragged in character. Use a 2 per cent magnesium sulphate solution with 0.2 per cent calcium chloride in it.

PREPARATION OF SOLUTIONS.

Sodium salicylate, 5 grams.

Distilled water, sufficient to make 10
c. c.

Sodii bicarbonate, 0.4 gram in 10 c. c.

of distilled water.

Bring each solution to a boil separately. Use a 20 c. c. Luer syringe. Suck up the 10 c. c. of salicylate mixture and then the 10 c. c. of bicarbonate mixture. Give in a vein at the bend of elbow as you would concentrated salvarsan. Use either a 19 or 21 gauge needle.

PREPARATION OF MAGNESIUM MIXTURE.

Take two 500 c. c. flasks, place 250 c. c. distilled water in each flask. Add 10 grams of magnesium sulphate, preferably Squibb's, to one flask; in the other dissolve 1 gram calcium chloride. Boil separately and filter into another 500 c. c. flask. Stop with cotton and boil this for five minutes and it is ready

for use. Give the above at body temperature, but do not bother to regulate the temperature of solution. From 300 to 400 c. c. of this mixture can be given at one dose. Give in salvarsan outfit with 19 or 21 gauge needle, taking one-half hour for the injection. Vomiting is liable to take place during this. Watch respiration and if it becomes shallow stop your solution.

LABORATORY WORK.

Check cases by determining urinary acidity and amount of chlorides. Get blood counts in all cases. If blood count is low and patient's general condition poor, magnesium sulphate should be used at once. Do not use stimulation until clearly demanded. Do not use aspirin and other drugs by mouth. A little whisky can be given if stimulation is necessary.

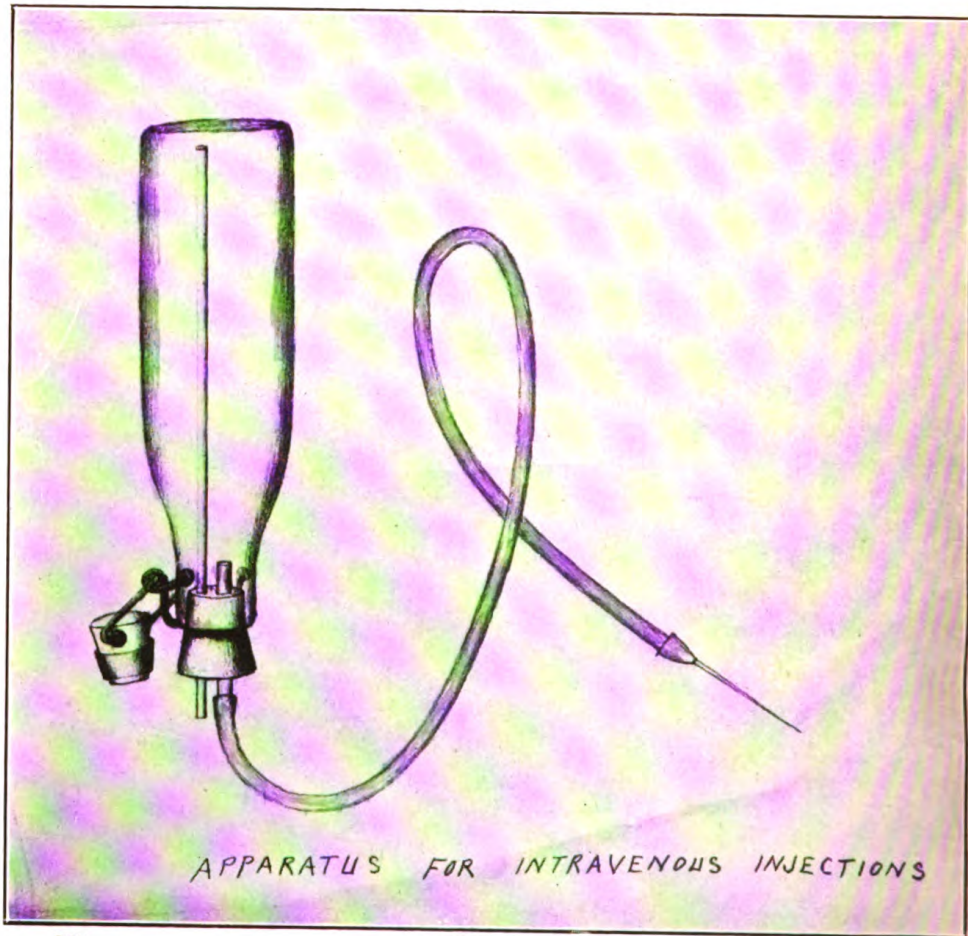
Improvement even in desperate cases followed the use of magnesium sulphate, and it was observed that the effect was produced rapidly. Improvement in general condition followed in 12 hours and often temperature fell rapidly to normal and the white count (raised at first) fell to normal and the patient made a quick convalescence. Absence of complications and sequelæ was notable. The benefit produced struck the medical officers as distinctly artificial. The drop in temperature was precipitous; seldom was there a marked or persistent increase in white count, which is usually associated with nature's method of overcoming infection, but instead often a fall coincident with improved general condition. In several cases it was noted that the white count, rather high before administration, fell rapidly to normal and the patient recovered. A not uncommon experience was that of failure of the first injection and success with a second injection 24 hours later.

Later in the epidemic an apparatus devised by Colonel A. Fiaschi, of the Australian Medical Corps, for administration of colloidal solutions in shock and used by the British during the war, was found most adaptable for employment with the magnesium sulphate solution. It is simple, easily sterilized, and the container will keep the solution sterile over long periods of time. It is readily transported, easily and quickly made ready for use and handled, reduces to a minimum the danger of air entering the vein and the aid of small caliber needle (19 or 21 gauge) makes it impossible to give the solution too rapidly.

This apparatus consists of:

(a) A glass bottle of about 500 mil capacity. The clamp stopper is of porcelain, with rubber gasket, after the style of an old-fashioned beer bottle. This may be sterilized, loaded with a proper amount of the sterile solution to be used, clamped and kept ready.

(b) A rubber cork with two perforations through which pass one long tube reaching to the bottom of the bottle and one short tube to which is attached a 3-foot length of rubber tubing in the end of which is placed a slip joint connection for the needle. The long tube admits air to the bottle and through the short tube the fluid flows to the patient. This part of the apparatus may be sterilized and kept ready for use or sterilized just before using.



267

To use, simply unclamp the bottle, insert the cork, and administer the solution by inverting the bottle at a level above the patient equal to the length of the rubber tube. The needle may be attached and sterilized with *b*. A glass-wool filter may be inserted in the rubber tube. The tubes passing through the cork are best when of metal, but under ordinary circumstances glass will do. Absolute sterility, proper preparation of solutions, length of rubber tube, and size of needle are essential.

BLOOD TRANSFUSION.

In spite of all efforts, it was found that a certain percentage of cases failed to yield to any form of treatment and progressed to death, even in the absence of heart or kidney conditions of such a nature as to reduce the chances of a successful outcome. In these cases the beneficial effects of the magnesium sulphate were transient and all medical officers were on the qui vive to further develop treatment in an effort to reduce morbidity and mortality.

About November 5, Lieutenant Commander C. W. Ross, Medical Corps, United States Navy, called to the attention of the medical officer a brief article on the use of immune serum, but the difficulty of carrying out such treatment rendered it impracticable. A few days later, Lieutenant (Junior Grade) E. J. Hund, Medical Corps, United States Naval Reserve Force, suggested that instead of an immune serum, citrated whole blood from individuals recently recovered from a severe attack of influenza, complicated by pneumonia, would be of even greater value than the serum, since, in addition to ease in application, it would not only furnish possible benefit from antitoxin present but other elements of the blood important in correcting the vasomotor paresis and offsetting the blood destruction. Dr. Ross, who was in charge of the temporary hospital for civilian employees in the navy yard, at once, with the aid of his junior medical officers (especially Lieutenant Hund, Medical Corps, United States Naval Reserve Force), developed the necessary system and technique for transfusing patients with whole citrated blood and proceeded to use it with remarkable results (5) (6).

Many cases, unconscious, deeply cyanosed, with little or no breathing space left and with extremely low white counts and temperatures of 105° and 106°, were relieved in 24 to 48 hours of symptoms indicating critical illness and progressed to a satisfactory outcome. It was notable that the diffuse pneumonic process rapidly localized to a lobar type. The effect produced appeared to be slower than that brought about by magnesium sulphate but more often was permanent and more nearly resembled a cure by nature with its resultant high white count and slower temperature fall. Convalescence once started was rapid and complete and complications and sequelæ were lacking.

It very soon became apparent that, with safety of application the best results were obtained by early administration, e. g., as soon as beginning cyanosis and physical signs showed that the so-called pneumonia was starting. A rise in temperature and a fall in white blood count with beginning cyanosis were deemed imperative indications for blood transfusion. Also it was found that if a response was not obtained in 12 to 24 hours after the initial transfusion a repetition of the treatment would lead to success.

QUININE SULPHATE INTRAVENOUSLY.

Based upon an article appearing in one of the medical journals claiming that quinine sulphate, intravenously, raised the white-blood count and produced good results in influenza, a trial was made of the method. Four cases received the treatment, in two of whom the dose was repeated, giving a total of six injections. The injections were given early in the influenza. All four cases subsequently developed pneumonia, and two received blood transfusion. Ten grains of quinine sulphate in 20 mls of distilled water were given at a dose into the vein at the bend of the elbow. Close watch was kept on the white blood count before and repeatedly after without discovering any change, either increase or decrease. There was no apparent effect upon the patient either for good or for bad. The administration of the drug was not continued.

FINAL DEVELOPMENT OF TREATMENT.

The final stage to which treatment was developed and with which the best results were obtained was as follows:

- (a) Absolute rest in bed.
- (b) Thorough and constant alkalization either by mouth or soda bicarbonate per rectum by Murphy drip.
- (c) Sodium salicylate intravenously only in cases not complicated by pneumonia, and then only when pain, restlessness, and high temperature evidenced severe toxemia.
- (d) Magnesium sulphate intravenously in pneumonia cases showing bad general condition, high temperature, and falling white count.
- (e) Blood transfusion (citrate method with whole blood) in pneumonia cases showing cyanosis, rise in temperature (either when first seen or after failure to react permanently to magnesium sulphate intravenously) and a falling white count.
- (f) Stimulation used more sparingly and only when indicated for special purpose or in selected case. Whisky, digitalin, or camphor used as stimulant.
- (g) Sodium iodide in simple cough mixture to relieve troublesome dry cough.
- (h) Magnesium sulphate by mouth for catharsis.
- (i) Carbohydrate diet.

RESULTS.

It will thus be seen that for purposes of comparison, the cases treated naturally fall into two groups:

(A) Those treated throughout the course of their illness in the emergency hospitals under conditions above described, and

(B) Those treated throughout the course of their disease in the base hospital fully equipped in every detail.

Group A, 1,221 cases, consisted of two types of patients, physically picked men, from the military force and civilians. These two types were about equal in number. The former lived under good hygienic and sanitary surroundings and were seen as soon as they began to feel sick. The latter lived under unfavorable hygienic and sanitary surroundings and were almost universally sick several days before coming under observation. This group received the more specific forms of intravenous medication gradually developed and extended as above described.

Group B, 615 cases, were all patients from the physically picked military force, living under good hygienic and sanitary conditions, and brought under observation as soon as they began to feel sick.

Almost universally this group received "expectant" and "symptomatic" therapy with great variety in drugs used to meet the apparent requirements. A very limited trial of blood transfusion and quinine sulphate intravenously on this group lead to its being discarded as of no value.

Like all statistics those herewith presented can be taken only in the broadest sense and considered only in connection with the remarks submitted which bear upon their interpretation. Every effort has been made to avoid the picking and choosing which so often hopelessly invalidates comparative figures.

The figures presented cover only influenza cases as every effort has been made to eliminate, wherever possible, all cases which were not definitely influenza. This was accomplished by keeping patients who were treated in hospitals immediately under the control of the medical officer for 48 hours before a diagnosis was made and by admitting all cases who had to be transferred immediately to the base hospital as with "diagnosis undetermined" in order that they might remain under observation at the base hospital until the possibility of other disease had been ruled out. A minority of patients were, unfortunately, transferred to the base hospital under the diagnosis "influenza" upon the first day seen but these transfers occurred largely at a time when experience had taught us more readily to recognize actual influenza cases at first sight, and, therefore, the errors in diagnosis can not to any great degree invalidate the figures presented.

Statistics dealing with admissions are based upon cases admitted between October 4, 1918, when the epidemic began in the first group, and November 30, 1918, when the epidemic had passed in all groups.

As some cases were continued on the sick list for a very prolonged period and straggling cases were constantly occurring following a subsidence of epidemic conditions, it was necessary for the purpose of this report to pick a date on which records of discharge should cease. Records showed that the bulk of cases were discharged 15 days after their admission and, therefore, December 15, 1918, was selected as the date for ceasing to record discharges of cases resulting from this epidemic. All cases remaining on December 15, 1918, are therefore disposed of as "remaining." This is a feature which somewhat, but not materially, invalidates statistics as to the average number of days the cases were on sick list, for should such cases have been followed out many more sick days would have been added to the total days credited to cases treated in base hospital and therefore to the grand total.

It is clearly shown by studying records that if a case was not discharged on or about the fifteenth day, convalescence was tremendously prolonged even into months, as is indicated by the fact that the average days per case of those remaining in the hospital December 15, 1918, were 46.5 days. Of those who were admitted and discharged during the period October 4, 1918, to December 15, 1918, the greatest number of sick days for any one case was 56. For those cases remaining on December 15, 1918, the greatest number of sick days for any one case was 69, on December 15. It is further to be noted that no cases remained on December 15 of those treated in emergency hospitals, all such cases being base hospital cases and that this was not the result of transfer from emergency to base hospital at the last minute.

At best, the total sick days are appalling, 20,391, which is equal to the Government having lost completely the services of one man for an average lifetime (55.8 years) or 13.9 men for one complete four-year enlistment, and all of this loss was concentrated in so brief a period of time as two and one-half months.

An unlimited variation of influences acted upon the different groups. These variations were more marked between the military and civilian groups and, of the subdivisions of the military force, the most marked variations of conditions existed between the prisoner group and the groups of personnel at large.

One of the most pronounced influences bearing upon a comparison of results in different groups, and especially when comparing the results of treatment, is that of the relative time of occurrence of the epidemic in the particular group. At the beginning of the epidemic we were in the dark as to the true character and course of

the disease and even more as to any satisfactory form of treatment. As time passed and our experience increased, successive groups received more intelligent care and treatment than those preceding and minute comparative study of cases of the same type shows a steady decline in the average number of sick days and the percentage of deaths, coincident with increased experience and development of treatment.

Furthermore, the first group affected (naval training camp) was also the group in which the greatest number of cases developed and developed most rapidly. It is the feeling of all, "If we had only at first known what we now know, it is certain that sick days and deaths would have been reduced, etc." While such a feeling is natural under all circumstances when happenings are viewed in retrospect, without doubt in this case it is not merely supposition and the saving of life and sick days would have actually occurred had we known beforehand what we now know.

Another difficulty in interpreting statistics results from the fact that the clinical condition of the patient frequently failed to conform to the ordinary interpretation placed upon symptoms usually taken as an indication of a patient's condition. For example, temperature, pulse, and respiration carefully and accurately taken often registered normal or thereabouts, and if viewed merely as a record oftentimes justified the belief that the patient was in excellent condition, whereas a glance showed him plainly to be in desperate straits, cyanosed, clouded mentally, and having an expression of great anxiety.

It became the custom to determine the real condition of the patient by his general appearance and actions, the white-blood count, urinary reaction, and to some extent by his blood pressure.

It was particularly noted that patients treated by intravenous administration of sodium salicylate, magnesium sulphate or blood transfusion made a far quicker convalescence than those treated symptomatically by mouth, and this is borne out by Table 11 and comparison of Tables 6 and 8, and by chart 7. Also deaths were reduced by intravenous treatment as shown by Table 10 and comparison between Tables 6 and 8.

The objection could be raised that this was the result rather of improved conditions existing at the two civilian hospitals in that they did not, as the training camp hospital did, labor under a great rush of patients, reduced personnel, and inexperience. This, however, can not be accepted as a just argument since identical cases, under the best possible conditions at the base hospital not receiving intravenous treatment, had a higher death rate and from two and one-half to three times the number of sick days per case.

Those treated by mouth were weak for days after all acute symptoms had subsided and showed a marked tendency to develop com-

plications, such as sinus and ear trouble, myocardial insufficiency, and, following pneumonias, massive pleurisies and lung abscess. The use of aspirin appeared particularly to predispose to prolonged convalescence.

Those treated intravenously were notably free from such complications and sequelæ (only two or three cases in all so treated had them) and even the severest cases became active and strong soon after the acute symptoms passed. Furthermore, the decline in death rate shows the good effects of the development of treatment.

Table 9 indicates the saving of sick days that resulted from the more specific forms of treatment in the difficult pneumonia cases. This table is based solely upon cases treated throughout their course in emergency hospitals. It is to be remembered that those receiving magnesium sulphate and blood transfusion were largely among the latter cases and in the civilian hospitals as the epidemic reached them later than that of the military forces and it was these civilian groups that furnished the more desperate cases—cases ill for 6 to 10 days before admission, with little care, little food, and often in most squalid surroundings. In other words, in spite of a worse type of case the more direct forms of treatment yielded better results than the symptomatic treatment did among the best type of case, namely, physically picked men living under excellent hygienic conditions seen early in the disease and, during its entire course, receiving the best of care under excellent surroundings.

Chart 7 shows graphically the delay in recovery of cases only treated symptomatically. This delay would be more evident had the cases treated symptomatically in the emergency hospitals been left out. From this chart it will be seen that of the pure influenza cases treated throughout their course in the emergency hospitals 94.5 per cent were discharged to duty by the fifteenth day of their disease and of pneumonia cases 75 per cent were so discharged; whereas of the cases treated throughout their course in the base hospital symptomatically only, it will be seen that of the pure influenza cases only 89 per cent had been discharged by the fifteenth day of their disease and of pneumonia cases only 25 per cent had been so discharged.

Table 10 gives the percentages of death in pneumonia cases treated by the different methods. This table brings out forcibly the failure of sodium salicylate in pneumonia cases and shows clearly the fall in death rate that took place following introduction of magnesium sulphate and blood transfusions. In this table a most striking comparison is available for here we have the death rate following purely symptomatic treatment among pneumonia cases occurring in physically picked men, seen early in the disease and treated throughout

their course, in a well equipped base hospital, compared with the death rate following intravenous methods for pneumonia cases occurring in civilians, seen late in their disease and treated in emergency hospitals. Under the column "Blood transfusion, civilians, Vallejo," the percentage can not in fairness be taken as indicative since these two deaths occurred in patients brought to hospital late in the disease and in a moribund condition when transfusion was given.

Certainly when a treatment will save an average of 4 to 18 sick days per case, reduce sequelæ of pneumonia and other complications practically to zero, and leave the patient strong and fit for work when discharged from hospital it deserves at least serious and honest consideration. And when there is a strong indication that this treatment will further save the lives of 17 to 21 men out of every 100, who would most certainly die, then it deserves more than consideration. It deserves a trial.

CONCLUSIONS.

Sodium salicylate used properly can be given intravenously without harmful effects and produces a favorable result in that it relieves pain and restlessness and saves the patient from the wear and tear of a severe toxemia and places him in a better position to fight more serious developments of the disease. In progressing to health without complicating pneumonia these cases showed rapid convalescence with a minimum of sequelæ. Sodium salicylate should not be used if there is evidence of beginning pneumonia.

Magnesium sulphate used properly can be given intravenously without harmful results and on most patients produced a most marked improvement in general condition and relieved edema of the lung and brain. Its best effect is produced when administered at the start of pneumonia and edema and if used at this time its effect upon blood count is more apt to be permanent. When used late and when the patient is deeply cyanosed and unconscious with lungs full, its favorable action was transient. Patients recovering after the use of magnesium sulphate showed rapid convalescence with minimum of sequelæ. The great advantage of the magnesium sulphate solution lies in the readiness of materials, simplicity of equipment required, brevity of preparation, and the fact that it can be prepared in advance and kept for long periods.

Blood transfusion, using whole blood by the citrate method, can with care be used safely under even unfavorable conditions as regards asepsis. Tests, previous to use, for syphilis, isohemolysins and isohemagglutinins are essential to safety. Results in pneumonia cases even of several days duration, unconscious and deeply cyanosed, were markedly favorable (edema cleared, pneumonic process localized,

brain symptoms disappeared, white count rose) and the general condition improved and rapid convalescence followed, with a minimum of complications. The drawback to blood transfusion lies in the difficulty of obtaining immune donors (especially early in the epidemic), the protective tests necessary, and the elaborate equipment required.

For the treatment of the acute respiratory infection, which has been so prevalent during this epidemic, blood transfusion has produced better results than any other one method.

Absolute rest in bed is the most essential element of treatment. This must be adhered to from the very first signs of illness to at least four days after temperature reaches normal. In the absence of the more specific forms of treatment presented above, a patient flat in bed and thoroughly alkalinized is better off without any form of mouth treatment (other than catharsis) than when loaded with analgesics, sedatives, and cough mixtures. The more specific forms of treatment as used at this station resulted in lower death rate, shorter convalescent period, and fewer complications and sequelæ than when the usual "expectant" or "symptomatic" methods were used.

The death rate at this station among those receiving the more specific forms of treatment was lower than the death rate given in any statistics that have come under the observation of the writer from other points at which the disease was of an equally severe type.

White-blood counts are essential guides to proper treatment. In general a stationary white count either high or low is favorable. A falling white count is a danger sign. A falling white count with rising temperature shows a seriously ill patient, and, if cyanosis is added, a critically ill patient.

Deaths did not occur from the influenza but from the pneumonia complicating the influenza.

REFERENCES.

- (1) Hogan, J. J. On the alleged dangers of intravenous injections in high blood pressure. *The Lancet Clinic*, January 2, 1915.
- (2) Hogan, J. J. Treatment of acute alcoholic delirium. *Jour. Am. Med. Assn.*, vol. 67, page 1826, December 16, 1916.
- (3) Meyer and Gottlieb. *Pharmacology, clinical and experimental*, page 530.
- (4) Fischer, Martin H. *Oedema and nephritis*, page 303.
- (5) Ross, C. W. and Hund, E. J. Transfusion in the desperate pneumonias complicating influenza. *Jour. Am. Med. Assn.*, vol. 71, page 1992, December 14, 1918.
- (6) Ross, C. W. and Hund, E. J. Treatment of the pneumonic disturbance complicating influenza. (Transfusion of citrated immune blood.) *Jour. Am. Med. Assn.*, vol. 72, page 640; March 1, 1919.

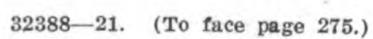


TABLE 6.—Cases of influenza treated throughout their course in emergency hospitals.

	Naval training camp.	Marine barracks.	Navy yard.	Vallejo.	Total.
Cases.....	718	87	283	133	1,222
Recovered.....	699	87	263	130	1,179
Per cent of cases.....	97.3	100	92.9	97.7	96.3
Died.....	19	.....	20	3	42
Per cent.....	2.6	.....	7	2.2	3.4
Pneumonia cases.....	59	2	65	29	155
Per cent of influenza.....	8.2	2.3	22.9	21.8	12.6
Deaths.....	19	.....	20	3	42
Per cent of influenza.....	2.6	.....	7	2.2	3.4
Per cent of pneumonia.....	32.2	.....	30.7	10.3	27
Influenza cases not developing pneumonia.....	559	85	218	104	1,066
Average days ill before seen.....	1	1	3	2.5	1.5
Average days in hospital.....	9.2	9.8	5.6	6.2	8.2
Average sick days.....	10.2	10.8	8.6	8.7	9.7
Average days, onset to normal temperature.....	5.5	5	3.3	6.2	5
Pneumonia cases.....	59	2	65	29	155
Average days ill before seen.....	1	1	3.3	4.8	2.6
Average days in hospital.....	12.5	18.5	11.5	10.4	11.7
Average sick days.....	13.5	19.5	14.8	15.2	14.3
Average days, onset to normal temperature.....	8	8.5	11.8	11.8	10.3
Average days pneumonia developed after onset of influenza.....	(?)	3	6.3	(?)	6.2
Average days death occurred after onset of influenza.....	5.6	.....	8.3	11.1	7.7
Average days death occurred after admission.....	4.6	.....	5	6.3	5

Recovered includes: "Change of diagnosis" and "Remaining," as none of these died.

TABLE 8.—Cases of influenza treated throughout their course in base hospital.

	Navy personnel.	Marine personnel.	Prisoners.	Total.
Cases.....	287	200	108	615
Recovered.....	264	220	94	558
Per cent of cases.....	91.9	90.9	87	90.7
Died.....	8	12	5	25
Per cent of cases.....	2.7	5.4	4.6	4
Diagnosis changed, result of complication or intercurrent disease.....	6	1	4	11
Remaining Dec. 15, 1918.....	15	8	9	32
Pneumonia cases.....	23	42	20	85
Per cent of influenza cases.....	8	19	18.5	13.8
Deaths.....	8	12	5	25
Per cent of influenza cases.....	2.7	5.4	4.6	4
Per cent of pneumonia cases.....	34.7	28.5	25	29.4
Diagnosis changed, result of complication or intercurrent disease.....	2	.....	3	5
Remaining Dec. 15, 1918.....	2	1	4	7
Influenza cases not developing pneumonia.....	264	178	88	530
Average days ill before seen.....	1.2	1.6	1	1.2
Average days in hospital.....	11.9	12.5	11	11.8
Average sick days.....	13.1	14.1	12	13
Pneumonia cases.....	23	42	20	85
Average days ill before seen.....	1.2	1.6	1	1.2
Average days in hospital.....	26.8	19.6	30.2	25.5
Average sick days.....	28.8	21.2	31.2	26.7
Average days pneumonia developed from onset of influenza.....	(?)	(?)	(?)	(?)
Average day death occurred after onset of influenza.....	12	9.2	12.6	11.2

Certain of those cases carried as with "Change of diagnosis" are also included in those "Remaining," as the complication was direct continuation of influenza. "Complication" means complications other than pneumonia.

TABLE 9.—*Effects of expectant and intravenous treatment influenzal-pneumonia cases treated in emergency hospitals.*

	Mouth.	Intravenous.		
		Sodium salicylate.	Magnesium sulphate.	Blood transfusion.
Number of cases.....	43	18	50	33
Average days ill before admission.....	2.1	1	5.8	4.7
Average temperature on admission.....	103			
Average days after admission first injection received.....		2	3.4	4.2
Average temperature before injection.....		103.1	102.4	102.1
Average temperature after injection.....		103	101.8	101.3
Average white-blood count.....	4,582			
Average white-blood count before injection (within 12 hours).....		8,606	7,681	5,665
Average white-blood count after injection (within 24 hours).....		8,744	8,744	7,734
Average white-blood count 4 days after injection.....		(?)	5,956	11,385
Average days from admission to normal temperature.....	14.6	6.8	6.4	9.8
Average days in hospital.....	16.8	13.1	12.9	14.5

Low temperature before injection: Many cases temperature low but patient bad general condition cyanotic anxious, restless, and temperature rising rapidly.

Low white count: magnesium sulphate: White count not indicative after magnesium sulphate unless associated with bad general condition and rising temperature, as magnesium sulphate acted rapidly with benefit but without producing rise in white count and by fourth day patient might be well and white count normal or below.

TABLE 10.—*Deaths; influenzal-pneumonia cases treated by expectant and intravenous methods.*

	Mouth.	Intravenous.		
		Sodium salicylate.	Magnesium sulphate.	Blood transfusion.
Emergency hospital, naval training camp:				
Cases.....	17	18	8	0
Deaths.....	5	7	1	0
Per cent.....	29.4	38.8	12.5	0
Emergency hospital, marine barracks:				
Cases.....	1	0	1	0
Deaths.....	0	0	0	0
Per cent.....	0	0	0	0
Emergency hospital, civilians, navy yard:				
Cases.....	21	0	7	28
Deaths.....	9	0	6	6
Per cent.....	42.8	0	35.2	21.4
Emergency hospital, civilians, Vallejo:				
Cases.....	4	0	24	5
Deaths.....	1	0	1	2
Per cent.....	25	0	4.1	40.0
Base hospital, military force:				
Cases.....	23	0	0	0
Deaths.....	8	0	0	0
Per cent.....	34.7	0	0	0
Totals:				
Cases.....	66	18	50	33
Deaths.....	23	7	8	8
Per cent.....	34.8	38.8	16	24.2

Treatment at base hospital almost entirely confined to expectant and symptomatic treatment.

TABLE 11.—Average days duration of disease from onset to disposal.

	Recoveries. ¹		Deaths.		Change of diagnosis.		Remaining Dec. 15, 1918.		Average for group.	
	Cases.	Days.	Cases.	Days.	Cases.	Days.	Cases.	Days.	Cases.	Days.
Cases not developing pneumonia:										
Treated solely in emergency hospital.	1,057	9.7			² 9	10.2			1,066	9.7
Treated solely in base hospital.	502	11.8			5	32.8	23	38	530	13.1
Cases developing pneumonia:										
Treated solely in emergency hospital.	109	15.5	42	7.8	4	14.3			155	13.4
Treated solely in base hospital.	48	26.3	25	11.2	5	59.6	7	45.5	85	25.4

¹ "Recoveries" covers cases discharged to duty well on or before Dec. 15, 1918. Those cases disposed of under "Change of diagnosis" and "Remaining" were also ultimate recoveries.

² These 9 cases had recovered from influenza and diagnosis was changed to another distinct disease. Practically all other changes of diagnosis were to complications of influenza and a direct continuation of that disease.

INTRAVENOUS USE OF MAGNESIUM SULPHATE AND CALCIUM CHLORIDE IN SEVERE PNEUMONIA COMPLICATING INFLUENZA.

Preliminary report of the results in 80 cases.

By J. J. HOGAN, M. D., M. R. C. S. (England), Lieutenant, Medical Corps, United States Naval Reserve Force.

During the recent outbreak of influenza at the navy yard, Mare Island, Calif., and in Vallejo, Calif., four temporary hospitals were established to care for such cases. Eliminating all the doubtful ones, there were 1,505 handled. These were distributed as follows: 947 at the naval training camp, 285 at the civilian hospital, Mare Island, 87 at marine barracks, and 186 at the civilian hospital, Vallejo, Calif. Of this number, 220 were pneumonias (16 per cent of total sick).

Of the total pneumonias, 50, or 22.7 per cent, were treated by the intravenous use of magnesium sulphate and calcium chloride with a resulting mortality of 16 per cent. These cases thus treated were distributed as follows:

	Training camp, Mare Island, Calif.	Civilian hospital, Mare Island, Calif.	Marine barracks, Mare Island, Calif.	Civilian hospital, Vallejo, Calif.
Cases.....	8	17	1	24
Deaths.....	1	6	0	1
Percentage of deaths.....	12.5	35.2	0	4.1

During the epidemic there was a terrific mortality rate from pneumonia treated by symptomatic measures. Of cases so treated at the naval training camp 41.7 per cent died and at civilian hospital, Mare Island, of those treated 42.8 per cent died.

Autopsy findings revealed small areas of focal infection with a rapidly spreading edema which in many instances involved the greater part of both lungs.

The physical condition of the patients was characteristic. After the initial temperature and prostration the temperature would fall to normal only to rise again even higher than before and then would come all the evidences of a rapidly fatal broncho-pneumonia, the patients dying with every indication of toxemic shock—rapid respiration with little pain or distress, a rapidly falling blood pressure (frequently below 80 systolic), cyanosis of face, lips, ears, and fingers. Along with this the laboratory findings showed an intensely acid urine, with greatly diminished chloride content. Albumen was present in 22 per cent of the cases.

The blood picture revealed a gradually dropping white count, in many instances below 4,000. This being the picture of an intense acid intoxication, alkali and sugar were given in large quantity with moderately good results, but with no effect on the white blood count, and inability to keep the acid intoxication in check by these means was demonstrated.

Having previously used magnesium sulphate and calcium chloride in severe infections of the streptococcus group and found that leucocytosis was stimulated by this means, a series of the more serious cases was given this treatment intravenously with the result that the completed work shows that out of 50 cases, 8 died, a total mortality of 16 per cent.

In the 24 cases under my personal direction at the civilian hospital, Vallejo, Calif., there was one death or 4.2 per cent. Comparing these results with a mortality of over 40 per cent in cases treated symptomatically, there is reason to believe that a careful following out of the following technique will be of value to the medical profession.

Preparation of solution.—In order to avoid severe reaction, it is advised that the method of preparing and giving the solution and the all-important after care be followed in detail. The proper preparation of the solution is essential.

Take two flasks each containing 250 c. c. of freshly distilled water. In one, place 10 grams of pure magnesium sulphate and in the other 1 gram of calcium chloride c. p. Boil separately and then filter together into a sterile 500 c. c. flask. Boil this and it is ready for use.

Method of administration.—Use a gravity salvarsan outfit and either a 19 or 21 gauge needle with a short beveled point. Introduce the needle into a vein at the bend of the elbow and allow the patient to bleed up to 50 or 60 c. c. Then start the magnesium mixture very slowly. About the only evidences of reaction will be a feeling on the part of the patient that he is burning up. If this sensation is intense, disconnect the magnesium mixture and allow the patient to bleed some more and then continue perfusion until 400 c. c. of the mixture have been administered and allow the patient to bleed through the needle again. If this technique is followed, there will

be very little reaction. A very generous urinary secretion with sweating follows in some cases and patients complain of thirst. This should be met with copious quantities of grapefruit lemonade made with grapefruit juice, plenty of sugar and a good alkaline mineral water.

If the patient's acid intoxication can not be kept down by mouth feeding an enema composed of two tablespoonfuls of sodium bicarbonate in one quart of water given two or three times a day is of great value.

If at the end of 24 hours there is no improvement, magnesium sulphate intravenously may be repeated. Several cases responded only after the second injection.

In addition to the reduction of acidosis, respiration, pulse and temperature came down and in nearly every case there was a marked increase of leucocytes.

The only other medication used was tr. digitalis in 10 minim doses where pulse was rapid and where supportive treatment was indicated.

It is desired to express appreciation to Commander John L. Neilson, Medical Corps, United States Navy, for his aid and support in using this method of treatment and to other medical officers associated in carrying it out.

ACCIDENTAL INJURIES FROM ELECTRIC CURRENTS.

By W. J. ZALESKY, Commander, and W. T. BROWN, Lieutenant, Medical Corps, United States Navy.

I. FATAL ACCIDENT WITH LOW-VOLTAGE CURRENT.

Death from electric shock occurs under widely varying conditions. In general, high-pressure currents are more dangerous than those of low pressure; however, it is not a matter of pressure alone, for death often results from currents of low pressure, and many cases are on record where contacts with high-pressure currents have been sustained without severe injury. Low-pressure currents cause death by paralysis of the heart (fibrillar contraction), while currents of high pressure kill by inhibition of the respiratory center. It is quite likely that currents of high voltage may be so changed by the condition of the contacts that they produce the effect of low-voltage currents.

Of equal importance with the amount of the current in determining the physical effects is the site, type, area, and duration of contact. If the heart is traversed by the current or the brain and spinal cord in contact, the effect of the current would, of course, be more dangerous. The body is extremely resistant to an electrical current, but

this resistance is greatly lowered when the clothing and skin are wet, increasing proportionately the strength of the current. The greater the area of contact the greater the effect, a large area causing diffusion of the current. An instantaneous contact with a high-pressure current may be encountered without serious result, but a fatal result will ensue if the contact is of several seconds duration.

It is in these cases of instantaneous contact, or contacts of only a few seconds duration with high or medium pressure current, that results from artificial respiration may be expected, as currents of these types cause suspension of respiration, the heart often continuing to beat.

In all cases of severe injury, even where death has apparently occurred, artificial respiration should be diligently maintained, with the tongue drawn out and the jaw pushed forward, as in drowning cases. It is also advisable to give adrenalin, atropine, or strychnine.

K. H. D., aged 19 years, fireman first class, United States Navy, on board U. S. S. *Upshur*, November 1, 1920, while cleaning a boiler mud drum received a fatal electric shock by a short circuit from a portable light attached to the Olongapo Navy Yard circuit. The current for this circuit is furnished by two 110-volt dynamos with a three-wire system, using the power of both dynamos (220 volts) for the motors in the shops and the power of each separately (110 volts) for the lights.

In order to clean the mud drum the deceased had crawled inside its narrow steel walls carrying the portable. He only had room enough to lie down, and the insulated wire to the portable lay against his body, directly over his heart. His skin and clothing were wet and dripping and he was jammed into the mud and water that had collected in the drum, with his body touching the steel walls. A companion working near, who had been conversing with the deceased, noticed that he was quiet, looked in the drum, and saw deceased lying on his face, the wire under his body, the light still burning. He detected smoke coming from the body and immediately pulled out the light plug and then removed the body from the drum. There were no signs of life. Artificial respiration was kept up for a long time and various stimulants were used with no response. There was a burned area on the chest the size of the palm of the hand, directly over the heart; also a burn on left arm and inside right hand.

Subsequent examination of the wire showed a break in the insulation, and deceased received the current directly through his body, traversing the heart. The contact was long, but there was probably

immediate fibrillar contraction of the heart and loss of consciousness, resulting in death.

II. SUSPENSION OF RESPIRATION FROM HIGH FREQUENCY (RADIO) CURRENT WITH FAVORABLE RESULT FROM LONG-CONTINUED ARTIFICIAL RESPIRATION.

The above case shows the fatal effect of a low-voltage current traversing the heart. In the following case the contact was with a radio high-frequency current of about 2,000 volts but of considerable strength, the generator delivering to the power transformer a current strength of about 40 amperes, as shown by the ammeter. The exact amperage of the high-frequency current is not known, but at the time of the accident the hot wire ammeter registered 14 amperes.

R. G., electrician first class (radio), while endeavoring to trace a short circuit which was interfering with the sending apparatus, was leaning over the spark gap tracing with his left hand the wires leading from the spark gaps to the oscillation transformer, and holding a pair of pliers in his right hand. His pliers evidently touched some other part of the apparatus and he received a severe shock, of which he was conscious and he voluntarily threw himself back from the wires and fell to the floor unconscious. After two or three minutes he partially awoke and complained of a severe pain in his head, was given a drink of water by his companions and by them assisted to the hospital, a distance of about 150 yards. On reaching the hospital at 1.15 a. m. he was placed in bed. He immediately became unconscious again with complete cessation of respiration. Artificial respiration was started with tongue drawn out and jaw pushed forward. The heart continued to beat in a forceful but irregular manner. A hypodermic of 1 c. c. adrenalin solution (1-1000) was administered and the artificial respiration continued. After about 15 minutes the patient gave a slight gasp and continued to do so after every second or third pumping motion of the arms. At 2.10 a. m. the patient regained consciousness and began to breath after 55 minutes of artificial respiration. He was kept in the hospital for the next two days, but apparently suffered no other ill effects except a small burn about the size of the head of a match on the forefinger of his left hand.

The inhibition of the respiratory center in this case, due to contact with a high-frequency current of considerable strength, is similar to the effect often produced by instantaneous contact with a high-tension current, and the value of artificial respiration in electric shock is demonstrated.

METHODS OF STERILIZATION IN DENTISTRY.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

I. STERILIZATION OF ANESTHESIA SYRINGES.

Doubt has been expressed as to the efficiency of the mixture of alcohol and glycerine in common use for the purpose of keeping sterile, and in some case for sterilizing, the conductive anesthesia syringes and needles. Experiments were conducted at the United States Naval Medical School, Washington, D. C., to determine the sterilizing qualities of the glycerine-alcohol solution with the following interesting results.

A series of tests was carried out to determine the antiseptic power of glycerine-alcohol solution, using cultures of *S. pyogenes aureus*. New barbed pulp-canal broaches were thoroughly contaminated with an agar growth of the organism, then immersed in the antiseptic solution for varying periods of time, and immersed in sterile tubes of bouillon. The tubes were incubated and examined after 24 hours for staphylococcal growth. Four series were run, and the results were uniform. In each series the organism was recovered from the broaches which had been subjected to the action of the antiseptic solution for a period of five minutes or less. No organisms were recovered from those broaches which had been treated for 10 minutes or longer by the glycerine-alcohol solution.

Exposure of antiseptic solution (minutes) :	Growth in bouillon.
1.....	+
2.....	+
3.....	+
5.....	+
10.....	0
20.....	0
30.....	0
40.....	0
50.....	0
60.....	0

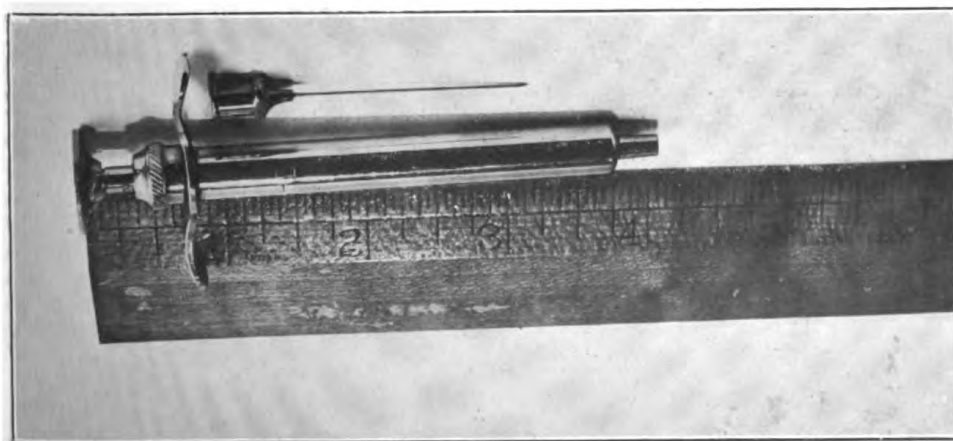
Four series were run and the results in each case were as above.

It will be seen that complete immersion for a period of 10 minutes or over apparently gives satisfactory results.

However, it is a very common practice, when a sterilizing jar containing the glycerine-alcohol solution is used, to suspend the syringe in the solution without immersing the finger grip or the handle of the plunger, and as this portion of the syringe comes into intimate contact with the fingers of the operator, which have in all probability been contaminated with secretions from the mouth of the patient then in the chair, a very fertile field here presents for the transmission of bacteria from the mouth of one patient to that of the next, unless a method for the routine sterilization of the above-mentioned parts is adopted.

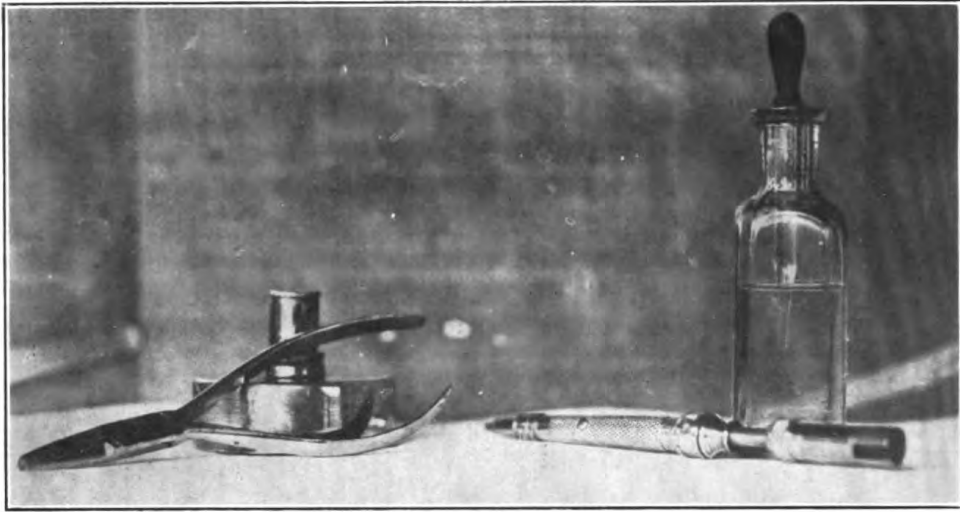


Containers for sterile cotton.

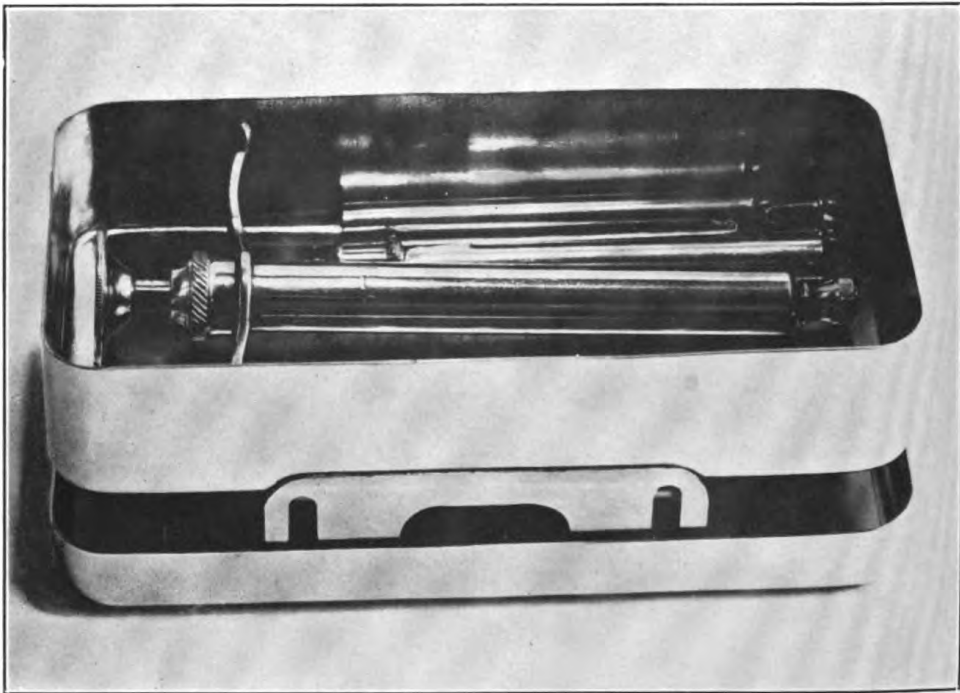


To show the type and size of syringe employed.

282-1



Apparatus for sterilizing handpiece in alcohol flame.



Conductive anesthesia apparatus in metal case prepared for emergency sterilization.
282-2



Three methods of preventing the above break in a sterile technic naturally present themselves.

First. Complete immersion in the solution for a sufficient period of time.

Second. Partial immersion with an additional sterilization of the parts not immersed.

Third. Sterilization of the entire syringe by some other method.

The first method necessitates the washing of the syringe inside and out with sterile distilled water upon removal from the solution, and it is doubtful if simple immersion would be sufficient to remove all traces of the tenacious and slippery sterilizing solution.

The second method would require two distinct processes of sterilization.

The third method is one which may be effected in a variety of ways, depending upon the durability of the syringe and the office facilities of the operator. Many of the syringes in use consist of a glass barrel with metal fittings, and the plunging of such an apparatus into boiling water is often accompanied by a slight click, which means a cracked barrel and the necessity of purchasing a new barrel with a plunger ground to fit. A simple and efficient method has been suggested for use where a Bunsen burner is available, and consists in covering the syringe and needle with distilled water of room temperature in a small pan or suitable container and bringing the water to the boiling point and boiling for the required length of time. The Navy, however, has no facilities for operating a Bunsen burner on shipboard, and an endeavor was made to formulate a technic, whereby the syringe and needle could be sterilized by boiling with the dental instruments. In the preparation of this technic several factors had to be considered. Among them that of possible breakage and consequent replacement was of prime importance, due to ships being often on duty for extended periods far from the base of supply. Furthermore, traces of alkali decompose adrenalin or suprenin solutions. Most boiling-water sterilizers contain water to which has been added sodium carbonate or borax.

An improved type of conductive syringe composed entirely of metal, light in weight and without washers, was designed by Captain E. S. Bogert, Medical Corps, United States Navy, in collaboration with the manufacturers, and the resulting syringe and needles are here illustrated and have been adopted for issue. This type of syringe is durable and is not subject to breakage from sudden immersion in boiling water or from careless handling. Possible traces of alkali from the boiling solution may be removed by filling the syringe after its removal from the sterilizer with boiling distilled water from a

dissolving cup and discharging into a waste receptacle, repeated several times.

The syringe as issued has also the additional advantage of being supplied in a metal case, which can be used as an extemporaneous boiling sterilizer as shown by the illustration. The syringe and needles in the upper container in the illustration, which is normally the bottom part of the case, is covered with distilled water and in the bottom container is placed one-eighth of an inch alcohol, which is then ignited.

II. STERILIZATION OF DENTAL ENGINE HAND PIECES.

A fault often noticed in the routine sterilization of dental instruments and appliances is failure to properly sterilize the dental engine hand pieces. This part of the dental apparatus is one which is used in the mouths of practically all dental patients and presents an unlimited field for cross infection, or the carrying of bacteria from one mouth to another, unless an efficient routine method of sterilization is adopted as part of every operation.

For a number of years the writer has been endeavoring to learn of some simple and efficient means to accomplish this. During the influenza epidemic hand pieces were boiled with the dental instruments, but this is not practicable, as a routine measure, for the mechanism of the hand pieces is seriously interfered with in the course of repeated boilings.

Sterilization of dental hand pieces may be effected in the autoclave, but this necessitates a number of hand pieces on account of the time factor and the office of the average practitioner is not equipped with an autoclave.

The following method, while not being offered as a means for rendering the internal mechanism sterile, is certainly an improvement over wiping with or immersing in alcohol and a very decided advance over no precautions at all.

The required apparatus is an ordinary 2-ounce bottle and a medicine dropper, the dropper being placed in the bottle and extending into denatured alcohol.

With the cone socket pliers grasp the hand piece about the center, and with the dropper drop sufficient alcohol to cover all exposed surfaces; then turn over the pliers and hand piece and cover the other side; finally place a few drops in the hole where the bur is inserted. Ignite the alcohol and allow it to burn completely.

Laboratory bacteriological tests seem to justify the method above suggested, as the following experiments were made at the Naval Medical School with the results here given:

(a) Instrument, after being thoroughly sterilized to eliminate existing contamination, was treated with a bouillon culture of the *staphylococcus pyogenes*.

aureus, taking care to work the culture into the crevices. This organism was selected, as it was considered as resistant as any of the ordinary mouth organisms.

(b) The instrument was then sterilized according to the indicated technique (applying alcohol with dropper and igniting the same). Subsequent immersion in bouillon failed to yield a growth.

(c) As a check on the above, the instrument was treated as in paragraph (a) and immersed in bouillon without sterilizing, resulting in a pure culture of staphylococcus. A growth was likewise obtained when the instrument, treated as in paragraph (a), was followed by alcohol without igniting.

III. HANDLING OF STERILE COTTON.

The following is a suggestion for simple and inexpensive sterile cotton holders containing a supply for each individual patient.

Holders can readily be made by using the ordinary glass 1-ounce ointment jars with aluminum covers. With the lid on the jar three triangular holes are cut in the lid, leaving a portion of the lid between each hole. The lid may then be unscrewed, cotton placed in the jar, and the lid replaced. The whole is wrapped and pinned in a small piece of muslin and placed in the autoclave or a flowing steam sterilizer for sterilization. Sufficient jars or holders for one or more day's use may be sterilized and held in reserve for use when needed by removing the muslin and placing on the bracket or operating table.

When the cotton is contaminated by the fingers, as in wrapping broaches, the molten metal method of sterilization provides a ready means for resterilization.

PEPTIC ULCER.

By C. S. NORBURN, Lieutenant, Medical Corps, United States Navy.

The following is a brief résumé of the diagnosis, technique of operation, and statistics of peptic ulcer as noted by the writer during a stay of several months at the Mayo Clinic, Rochester, Minn.:

Because of the fact that a large number of seemingly unrelated factors may produce symptoms referable to the stomach, a patient complaining of trouble in this region is examined most carefully. A thorough history is taken by "first allowing the patient to talk freely of his complaint, then by direct questioning, and finally by repeated review." A complete physical examination is made, accessory sinuses, mouth, and tonsils being carefully inspected for any septic condition. A Wassermann is done and a blood count made and examinations of stools, urine, and sputum. The Ewald test meal is used in gastric analysis and fluoroscopic and radiographic examinations are made. The impressions gained by this study are now

carefully correlated. "A diagnosis of peptic ulcer can not be too strongly fortified, and any gross discordance between the findings from all sources should make the examiner cautious in his opinion."

The points of most value in a history of duodenal ulcer are those of periodicity of pain—spells from a week's to a month's duration which in many cases began 10 or 15 years before—slight at first and separated by long periods in which the patient was entirely well, later gradually increasing in frequency and severity. This pain is not caused by any particular kind of food; all foods tend to relieve it. (A dyspepsia caused by grease or apples or any particular kind of food usually indicates gall-bladder trouble and comes on within 30 minutes after food is taken).

During a period of active symptoms the pain reappears each day just as it did the day before—two to five hours after meals. The patient often speaks of relief by soda and gives the usual symptoms of hyperacidity. He may give a history pointing to the hemorrhage of perforation. "Such a history as the above, combined with a physical examination showing tenderness in the epigastrium or just to the right of the midline; rigidity of the rectus; a report of hyperacidity; excessive motility on fluoroscopic examination and deformity of the duodenal cap, make the diagnosis of ulcer almost certain." Some important points in the differentiation of gastric ulcer from duodenal ulcer are as follows: The periodicity in gastric ulcer is less well defined and the daily recurrence less constant. Pain comes on one to two hours after meals and small meals give greater relief than large ones. Radiographic examination shows the niche or filling defect. The pain is epigastric, in the center or to the left. The pain in the back so often spoken of usually means chronic perforation posteriorly in which the pancreas is eroded.

At the Mayo Clinic they now believe that most peptic ulcers are septic in origin—acid-loving streptococci being carried by the blood stream from some focus of infection lodge in the walls of the stomach or duodenum producing a devitalized area which is readily eroded by pepsin in an acid medium. Rosenow has isolated these streptococci from ulcers and by injecting them into the veins of animals has produced peptic ulcers in a high percentage of cases.

The treatment begins, therefore, with the clearing up of any septic focus found. In very recent cases of ulcer, without bleeding or perforation, the patient is asked to undergo medical treatment to give the ulcer an opportunity for spontaneous healing. It is thought that a small, clear-cut ulcer extending down to the muscular coat only may heal; but an ulcer of long standing which shows indurated edges and a perforation through the muscularis, with often an involvement of the peritoneum which is patched over with a mass of adhesions, is essentially a surgical condition. While periods of

quiescence may be brought about by medical treatment, surgical examinations have proved repeatedly that they heal spontaneously only in rare instances. Those lesions reported by X-ray examinations as healed are found at a subsequent examination to still exist, the ulcer probably having been filled with food at the time of the former study. In addition to a speedy relief of symptoms an operation reduces the possibility of hemorrhage and perforation to a minimum and in cases of gastric ulcer it greatly reduces the chance of death from cancer.

When the abdomen is opened a very careful examination of the entire stomach and duodenum is made. If no lesion is found no operation is performed. That is to say gastroenterostomy is not done on the strength of symptoms alone, as was formerly the case. Over 70 per cent of peptic ulcers are found on the duodenal side of the pyloric vein, practically all of these being above the entrance of the bile duct. Care is taken to exert no tension on the stomach while examining the duodenum, thus preventing the appearance of an anemic spot just below the vein, caused by tension and sometimes mistaken for an ulcer. Unless the ulcer is easily demonstrated, Stimson's sign is of the greatest value: If the suspected spot is rubbed with a piece of gauze and examined a few minutes later an area over the ulcer will show bright red stippling due to the distension or rupture of an unusual number of new capillaries.

As duodenal ulcers never cause cancer, the Mayos cauterize or excise them only when they are yellow in color showing a devitalized area, bleeding or perforation, and in these cases only when approach is not difficult. As there seems to be some physiologic connection between the appendix and duodenum the appendix is removed and a gastroenterostomy performed. No attempt is ever made to obstruct the pylorus as was formerly done. Gastroenterostomy prevents perforation and usually but not always prevents hemorrhage. Judd has been running a series of 100 in which, in favorable cases, he is excising the large anterior duodenal ulcer and through the opening so made cauterizes the "kissing ulcer" of Moynihan which is almost always present on the posterior wall. In those cases where there is no obstruction after repair is made, he does no gastroenterostomy, believing that, as the conditions which call for gastroenterostomy in stomach ulcers are not present here, simple removal of the pathological feature is all that is necessary.

In a pathological study of 216 resections of the stomach for ulcer or cancer, MacCarty concludes that 71 per cent of the cancers are associated with ulcer, and that 68 per cent of ulcers are associated with cancer, the basement membrane of some of the gland tubules at the edge of the ulcer being ruptured, and the epithelial cells infiltrating the stomach wall. The malignant nature of this condi-

tion has only recently been fully appreciated. There have been several deaths from cancer in which this condition was noted at the time of operation but the ulcer was not given a wide enough margin. The roentgenologists predict cancer in all gastric ulcers as large as a 25-cent piece, and are right in the great majority of instances.

All gastric ulcers are excised at least one-half inch from their margin, or thoroughly burned out with the cautery. The vessels running into the opening are ligated; the opening is closed and buried with Lembert sutures. A posterior gastroenterostomy is then done in all cases. One reason for this last is that excision of a part of the stomach wall seriously interferes with its motility, so that often no food will pass through the pylorus for several days. Especially is this true after interference with the lesser curvature where ulcers are generally situated. Gastroenterostomy is justifiable if only for the added safety of these first few days. A second reason is the claim that gastroenterostomy lowers acidity 20 to 30 per cent, thus changing the environment of the acid streptococci. Where either excision or gastroenterostomy is done alone the symptoms recur in from 30 to 35 per cent of cases. In gastric ulcer within $1\frac{1}{2}$ inches of the pyloric vein the whole pylorus is resected, the end of the duodenum closed and a loop of jejunum 18 inches from the ligament of Treitz united to the opened end of the stomach in the so-called "Polya operation."

As there are cases which do not improve when treated by surgery alone every patient should be advised in regard to post-operative care until a permanent cure is assured. Dieting is especially important until the gastroenterostomy has become thoroughly united. It unites by granulation and requires about 14 days.

Gastro-jejunal ulcers occur at the margin of a gastroenterostomy opening in a small percentage of cases. Formerly when silk or linen was used for the outer suture they occurred in 4.5 per cent. The fact that at operation silk or linen sutures were often found hanging in these ulcers lead to the abandonment of permanent suture material and to the use of chromic or tannic acid catgut in both layers. This has reduced the occurrence of gastro-jejunal ulcers to 2 per cent.

The symptoms of this condition are the return of the old trouble after a period of relief, and a definite tender spot in the left epigastrium. In a second operation to relieve this complication the risk is considerably higher than in operation for cases of simple ulcer. Treatment consists in separating the union between stomach and jejunum, excising the ulcer, and closing both openings. If the original ulcer has healed and there is no obstruction, nothing further is done. Otherwise a new gastroenterostomy is made at another place or else the pylorus is resected and a Polya operation performed.

It is claimed that 81 per cent of patients with duodenal ulcer operated upon at the Mayo Clinic are cured and 10 per cent markedly

benefited. I do not have the figures in gastric ulcer, but they are not so high.

Some interesting figures were brought out by an investigation carried out under the direction of Mr. Arthur Hunter, chief actuary of the New York Life Insurance Co. upon 2,431 patients operated on for peptic ulcer at the Mayo Clinic between 1906 and 1915 with the purpose of determining the insurance risk of such patients. All but 108 cases were traced. The average age was 42 years. The figures show that the operative mortality for duodenal ulcers was 2 per cent, while the operative mortality of gastric ulcers was 4.5 per cent. The patients were under observation three and one-half years, and in that time 5 per cent of the duodenal ulcer cases had died from all causes—slightly less than the percentage for the general population of the same age. Of the gastric ulcer cases, 17 per cent had died from all causes.

Technique for posterior gastroenterostomy: Make a high right rectus incision starting about one-half inch to right of midline, dividing the muscle fibers obliquely so that the lower end of the incision is from three-fourths to 1 inch to the right of the midline. C. H. Mayo points out that this oblique incision gives a stronger abdominal wall when healed than does the muscle-splitting incision. Self-retaining retractors may be used to advantage.

The stomach and transverse colon are now drawn out of the wound. By drawing the transverse mesocolon upward and to the right the origin of the jejunum is brought into view. A fold of peritoneum will be seen extending from this part of the jejunum upward to join the mesocolon. A rent in the mesocolon beginning near this point of juncture will allow the most dependent part of the stomach to be drawn through for the anastomosis. Where possible a bloodless spot of the mesocolon should be selected. If deemed necessary to divide the branch of the colic artery it should be remembered that inosculation between the middle and left colic arteries takes place in only three out of four cases. Before dividing, pinch with both hands and be sure it pulsates from each side. Division of this artery in a case where inosculation does not occur means thrombosis and gangrene of the bowel. By means of an Allison's forceps seize the greater curvature of the stomach at its most dependent point, somewhat to the left of its midline, and draw it through the rent. It is found that where the *opening* is made to the left there are fewer closures than when made nearer the pylorus. The stomach is grasped with a second Allison's forcep about $2\frac{1}{2}$ inches from this point in the direction of the pylorus and lesser curvature. The edges of the rent in the mesocolon are now stitched to the stomach wall, for at this stage it is easy to put in the more important posterior sutures. Lifting upon the two forceps, seize this fold of the stomach between

the two blades of a rubber-shod clamp. If this clamp is properly applied it will be found to lie on the posterior wall of the stomach. the handles downward and to the right and the blades extending upward and to the left.

Now, the transverse mesocolon is again drawn upward and the jejunum picked up as it emerges at the ligament of Treitz. Two Allison forceps are applied about $2\frac{1}{2}$ or 3 inches apart in the longitudinal axis of the gut on its upper anterior aspect, a distance of two-fifths its circumference from its mesenteric attachment.

The proximal clamp is usually placed at a point about 2 or $2\frac{1}{2}$ inches from the duodeno-jejunal junction. This is the "no-loop" method. In fat persons with heavy transverse mesocolon make the loop longer, even to 6 inches, in order to avoid traction. Apply a second rubber-shod gastroenterostomy clamp to that portion of the jejunum between the two forceps. Replace all abdominal contents except that held by the clamps. Place a strip of gauze between stomach and jejunum and bring the clamps side by side. Care is taken to see that the intestine is not turned upon itself but continues to run in its normal course, from right to left. The clamps may be held together by hemostats at each end of the rubber tubing. Thoroughly isolate the field of operation by means of a double layer of gauze packs.

Absorbable suture material should be used throughout (No. 0 or No. 1 chromic or tannic acid catgut). The suture proposed by William Bartlett, in which a strand of tannic acid catgut is swaged into a fine straight intestinal needle, makes a very small hole and is the best.

The stomach and bowel are united by a continuous Lembert suture for a distance of $2\frac{1}{2}$ or 3 inches. It is better to take deep sutures even at the risk of going into the lumen than to risk the sutures tearing out from gas distension. When this row is completed a back stitch is taken and the needle and suture folded in gauze until needed to make the corresponding suture in the upper layer. The serosa of the stomach should now be incised, one-sixth inch from and parallel with the suture line. The large gastric vessels exposed by this incision are divided between mosquito forceps and tied. This eliminates the danger of postoperative hemorrhage into the stomach. The incision is now carried through the wall of the stomach and a similar one into the lumen of the jejunum. The escaping contents of both viscera should be carefully caught up with gauze. It is unnecessary to trim the mucosa, save perhaps at the angles of the jejunal opening. The hemostatic suture is now begun at the end opposite to the commencement of the Lembert suture, and the edges of the stomach and jejunal openings are sutured together with a

glover's stitch, through all coats posteriorly and with a Connel stitch anteriorly. Upon arriving at the starting point the two ends of the hemostatic suture are tied together and the knot allowed to slip into the lumen of the bowel. The anterior suture line is now washed with a damp sponge and the upper layer of protective gauze discarded, together with all instruments used up to this point. Complete the Lembert suture anteriorly, finally tying it to the free end left at its commencement. Again sponge the suture line and remove all gauze.

A few sutures are taken between the jejunum and stomach a short distance from their union so that the bowel runs by the anastomosis rather than hangs from it.

The viscera being returned to the abdomen, it will be found that the line of anastomosis will extend across the posterior wall of the stomach, downward and to the left, and that the jejunum runs in its normal course to the left to form its splenic flexure.

A SURVEY OF 50 GENERAL COURT-MARTIAL PRISONERS.¹

By C. H. CASTLE, Lieutenant, Medical Corps, United States Naval Reserve Force.

The interest in this survey was aroused by the daily sick call at the brig, owing to the very evident contrast between the prisoners' physical and mental qualifications. While their physical condition was good and compared favorably with that of other men in the service, one could not help noting their mental deficiencies. I am satisfied that the majority of these men are not criminals in the ordinary sense of the word, but are defectives in that they are age-retarded in mental development.

Their type of mentality—whether due to true age-retardation, environment, heredity, or other cause—is difficult to establish, although with few exceptions they all showed marked defective tendencies and some typical stigmata of degeneration.

The theory of defectives as stated by Binet and Simon, and the one that appears most tenable, considers the defective as resembling the normal in many respects except as to age-retardation. In other words, they resemble normal youths in some ways but are retarded in others. This constitutes the main difficulty in handling these cases, as the common construction put on them would be that if given a chance they would overcome their deficiencies. This is not correct, as age-retardation is a definite condition, and the mental condition in most cases is not progressive but stationary, and the possibility for mental development ceases at a certain age.

¹ At the United States Naval Air Station, San Pedro, Calif.

An unequal development is the differentiating mark of the defective. In many ways he is on a level with other youths of his age, but in others he is imperfectly developed. This produces a want of equilibrium.

The defectives have been grouped in two main classes. First, the true age-retarded, who is a pleasant and sometimes likeable youth, and while not completely lacking in intelligence, is not sufficiently endowed to work and learn alongside of others who are normal. Second, the unstable and erratic type, who is a positive nuisance. The first type in a highly specialized work such as the naval service is a positive loss and a detriment. He is unable to make his rate with the other men by taking advantage of the opportunities for schooling and training offered. He is punished for minor infractions of discipline, finally becomes discouraged, and deserts. Unpleasant as it may seem, the Navy life with its apparent security attracts this type of men to a great degree. The second type, the unstable and unbalanced, is erratic and rebels against all discipline, and, as stated before, is a constant source of trouble.

There is a third type that is really a mixed one, composed of men who have the characteristics of the two first types, which, according to Binet, constitutes one-fifth of the number of defectives, while the first two are about evenly divided among the balance. In this survey the first class was greatly in the majority, constituting practically 80 per cent of the number.

To aid in carrying out this survey a blank was prepared and printed with the following headings, viz:

Name, Status, Rate, Age, Height, Weight, Previous service, Service, Education, Previous occupation, Family history, Working history, Statement, Remarks. In explanation of this chart I would say that status was noted as G.C.M. prisoners (with offense); and if desertion, length of time gone. Service indicated length of time on present cruise before offense. This also carried reference to adverse entries on record, if any. Education was indicated by the number of grades finished and note was made of the reason for quitting school; also progress and as to whether more than one year was required to make one grade. Family history included all that is ordinarily sought in medical examinations and particular attention was given to history of alcoholism and insanity in any of the family. Working history included age when work was begun and working conditions; wages received and money saved; character of work, whether steady or intermitten work. The heading "statement" was the man's own story as to his experience in the Navy. This was asked to test the memory and mental attitude as well as to elucidate any common causes.

There was also included a note of the result of the Binet test for age. This test was left until all the rest of the questions had been answered. The examinations were carried on at the dispensary. The examiner was in a room alone with one man, who was encouraged to do his best. I was glad to note that, with two exceptions, none of the men failed to try. They were given every opportunity and by the time the questions given above were finished the majority of them were at their ease. There was also a set of questions which I call, for want of a better name, educational tests No. 1 and No. 2. These consisted of 10 questions in each test, which were as follows:

General educational test No. 1.—1. What is a fraction? 2. What is a republic? 3. How many ounces in a pound of butter? 4. Who was President during the Civil War? 5. Name a large town in Massachusetts? 6. What is Uncle Tom's Cabin? 7. What is our National Hymn? 8. What and where are St. Louis, Denver, Mississippi, Montana, Superior? 9. Spell the following words correctly—orchard, waiting, formerly, California. 10. Give your idea of honesty, justice, health, generosity, selfishness, poverty.

General educational test No. 2.—1. What is geometry? 2. Give the difference between republic and monarchy. 3. What is avoirdupois weight and how does it differ from troy weight? 4. What is the metric system? 5. Give names of three Presidents who were assassinated. 6. Who was William Shakespeare and what did he write? Give three. 7. What are the colors? What and where are Naples, Algeria, Suez, Amazon, Norway? 9. Spell the following words—separated, scissors, shoulder, salary, Philadelphia. 10. Give your idea of government, socialism, responsibility, wealth, ambition.

These questions are not memory tests such as are given in schools, but idea tests and have permitted fair judgments of a man's intelligence. In this connection it is interesting to note that only a few ever reached test No. 2. These questions are not given as a model, but were selected from about a hundred questions given to a number of average enlisted men, because they were the ones most generally answered correctly. They have also been approved as fair questions for sixth and eighth grade school pupils. The weight test described by Binet was given and particular care was taken in giving the order. This was by use of five boxes, identical in size and appearance, weighing 9, 12, 15, 18, and 21 grams. The order was given as follows, enunciated slowly and distinctly: "Here are five boxes; you will pick them up one at a time, using one hand, weigh them carefully, and place them in a row in front of you with the lightest one to your right and the heavier ones to your left, according to weight." It was interesting to note how many of the men asked that the order be repeated and how many placed the boxes in direct opposition to the order. A man was required to place these boxes correctly twice out of three trials. Failure in this simple test, given by Binet as a test for the age of 10 years, was not uncommon, and it is easily seen that a man who would fail in this test would hardly be able to understand and carry out an order given perhaps hurriedly or deliver a verbal

message correctly. These boxes were ordinary pill boxes, weighted with sand. The test of repeated numbers was also used, as well as the vocabulary test, in which the man was asked to give as many words as he could in three minutes. This test was used when the Binet age was difficult to obtain.

Inasmuch as 46 of these general court-martial prisoners were deserters, their consideration is the purpose of this article. The other four offenses were fraud, embezzlement, insubordination, and scandalous conduct, and represent perhaps the ordinary percentage that may be expected in any organization. It is interesting to note that these four men were of much longer average service than the deserters. In fact their service averaged 3 years against 10 months for the others. I am satisfied, however, that three out of four of these last-mentioned men are defective from the fact they are age-retarded as shown by tests.

The cost of the turnover of men in the Navy with the present high percentage of desertions is difficult to compute, but from an individual standpoint a recent survey made in an eastern factory showed that the cost of every employee hired to replace one who stopped work was approximately \$50. The principal items in this bill of costs include the expense of maintaining idle machinery, while workers who have left are being replaced, loss of time in interviewing new applicants, training of new workers, and loss in efficiency due to constant flux of the working force. Other concerns arrive at comparable figures. An automobile concern estimates the individual cost at \$100, an electric light concern at \$217, a New York tobacco concern at \$200 to \$250. How much more the desertions must cost the Navy when there is taken into consideration the expense of maintaining the recruiting service and expenses incident to training the men, clothing cost, transportation, etc.

The result of this survey is not conclusive. It represents only a comparatively small number of men unselected, but who have committed a common infraction of discipline. Some results were arrived at that were not expected and some that were expected failed to materialize. I had expected to hear stories of abuse and unfair treatment from their standpoint, as justification for their desertion, but in only a few cases was this noted. The average age was 20 years. The average schooling six and one-half years. The average length of time in the service was, as given before, 10 months. The average time gone from the service was 5 months. The average Binet-test age was 14 years. There was one first-class petty officer and the rates below were divided as follows: Seaman rates, 22; fireman rates, 14; hospital corpsman, 2; and 1 of each of a number of other rates. There were two men, one a Porto Rican and one a Filipino, who were unable to speak enough English to make the tests

at all reliable. I believe this was accountable for their failure to understand orders, hence their trouble. Only one of the men refused to make a statement, and he was a deserter of over three years' standing and a much older man than the rest of the prisoners.

The comparatively large number in the families from which these men came was noted. Twelve of them were, according to their statement, "only sons." The balance came from families of over five children. It was also noted that ~~over one-half~~ of the men were either half or whole orphans.

A typical history would be about as follows: Name, John Jones; status, G. C. M. prisoner; gone, three months; rate, F.2c; age, 19; height, 5 feet 5 inches; weight, 144 pounds. Previous service, none; service, 10 months; education, finished sixth grade; previous occupation, garage work; Binet test—age, 15; family history, mother dead, died when he was 9 years old, father living, three brothers and one sister. Father somewhat of a drinker; conditions at home not pleasant; ran away at various times; averaged three months on a job; wandered to different cities; enlisted in the Navy because he wanted to be sure of a job. Sent to detention camp; got along all right there; transferred to ship; was "A. O. L." a few times; warned, and perhaps a deck or summary court; finally associated with others in the same fix and deserted.

I found this association marked in many cases. Hardly a man would admit that he left alone. After he left he loafed until his money gave out, and most of them stated that they had plenty when they left, then took the first job that offered. There was not a single recognized trade represented which had been learned by these men previous to their entry in the Navy. The history from then on was very similar in most cases and a large percentage were arrested as vagrants and confessed to the civil authorities that they were deserters from the Navy.

The weight test was passed the required number of times by 33 of the men, a few of whom placed the boxes correctly three times straight. Of the remaining 17, several failed completely and others were successful once in three times. The vocabulary test revealed only what had been elucidated by the education questions, and a limited vocabulary and lack of coordination of ideas were noted. This survey was not altogether without its humor. One man told me that a monarchy was a place where Catholic children were sent. Another—this one claimed a high-school diploma—that Uncle Tom's Cabin was a movie and that Ben Hur wrote the story.

There are perhaps many conclusions that might be drawn, but the one that impressed me most forcibly is that most of these men were unfit for the service, from a mental standpoint, at the time of enlistment. I firmly believe that at some future date the mental examination of

recruits will be considered as necessary as the physical one is to-day. A standardized set of mental tests to be given at the time of enlistment, with results entered in the health record, as well as the history pertaining; subsequent mental examinations at the end of six months with note of improvement or lack of same; and another at the end of the first year would, in my opinion, be of immense help in maintaining efficiency.

THE SYSTEMATIZED HOSPITAL TRAINING OF APPRENTICES.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, United States Navy.

The great influx of untrained and inexperienced youth into the Navy enlisted personnel has made itself felt in hospitals as elsewhere. This has been somewhat detrimental to the highest standard of work, unless this high standard is maintained by extremely close supervision on the part of the trained senior. The urgent importance of getting work done in the best and quickest manner, according to the needs of the moment, has led us to some extent into thinking more of the work at hand and somewhat less of the full training of the individual hospital apprentice. It has led us to choose, often in a somewhat haphazard manner, the man best fitted for certain duties and frequently to retain him there for long periods, to the benefit of the duties but, at times, to the detriment of his full training. Indeed, it may occur to the extent of such monotony and fatigue that the man's ambitions are sorely tried and his morale depressed. It has led us to place the less experienced and the less apt individuals on details of little importance, but much drudgery, and to keep them there at times indefinitely. This results, too, partly from a natural tendency to allow the assignments to remain as they are when once affairs are running smoothly.

Men are occasionally met who have been in the service a year and a half or more who are very well trained in one or two branches of the Hospital Corps work but who are woefully ignorant of anything else. For instance, there are men who understand paper work well but who have had no experience at the bedside; others that know ward work thoroughly but have never been inside a laboratory or an operating room.

In order to simplify the apportionment of the Hospital Corps details and to insure the training of the new hospital apprentice, it would seem that some form of systematized routine for apportioning details would be preferable to any unstudied method of chance. The hospital in the Navy, just as in civil life, should be a training school as well as a haven for the sick. The essence of successful training lies in the rotation of service, whereby the individual hospital corps-

man is at least exposed by contact to all branches of hospital work. In order to facilitate such a rotation of service the work of the hospital must be divided into various working sections according to a definite schedule. This schedule once adopted should be strictly followed.

The purpose of this paper is to outline such a plan and to state some of its advantages. It is proposed that, although 18 months is a rather short period of elementary training, yet it is a very practical one from a Navy point of view. According to the plan hereby submitted the 18 months' training course is divided into six periods of three months each, and the work of the hospital into six working sections. These six working sections are obtained by dividing the total complement into six equal groups of men and then uniting into a section a sufficient number of details, allied in nature, that will require for their performance the number of men in a group. The period of three months is considered to be a minimum period in which the untrained individual could gain an acquaintance with the work in a section, and at the same time is long enough to provide for considerable stability. The work in each section is then roughly graded as far as practicable into three grades or sets each of a month's duration, and if the nature of the work will allow it one above the other, and the number of men in the section apportioned equally to each. This feature, although not absolutely essential to the general plan, would facilitate the inner workings of the section. The first of each month is designated as "change day," and the one-third of the men in each section are to be moved out to begin as new men in another section. The other two-thirds (to advance within the section if the section work is graded) remain as a balance of trained men to stabilize the work and aid in the instruction of the newcomers. In this manner section work would not be disrupted by the change and would be to a large extent self-administering and self-instructing. The work in the wards should be similarly apportioned into monthly periods, including the night duty.

A card should be made for each individual and the changes of sections and dates recorded, and then placed in a rotation file. No one who has not completed the course should remain over three months in any one section, but should be moved on from one section to another until he has completed the course. The efficiency, usefulness, and purpose of this scheme consists solely in this point, which should be rigidly enforced.

There is considerable diversity in human nature which expresses itself in a diversity of interests. Men will find the type of work most to their liking, and later may elect this type of duty, such as laboratory, X-ray, etc., when afforded the opportunity, and thus

develop greater interest and loyalty because of higher self-expression and recognition.

There is nothing new about such a system. It is used in all big teaching hospitals. It is the basis of the grade in schools—in fact, it is a closer application of the general scheme of ratings in the service. Some such method in a general way is loosely and unconsciously carried out at present in all our institutions that have a changing and developing personnel, but the conscious recognition, application, and enforcement bring definite, consciously recognized results and growth.

It is not to be supposed that the student hospital corpsman by thus working through the various sections will become very adept or skilled in all or any one of the many types of work attempted. This early training is not a period of specialized instruction but rather one of general experience wherein a broad view of all the work done by the Hospital Corps is gained. In fact his accurate knowledge in some cases may be very limited or nil as regards certain phases of work. Yet necessarily he will have gained considerable insight into the workings, the why and wherefore of various procedures, so that his work will become increasingly intelligible to him. He will know that there is such a thing as a laboratory where many tests are performed and he may learn to do a few of the simpler ones. It is not supposed that everyone will have opportunity to obtain experience in each of the several related small divisions of each section, but by spending a period in that section one will gain some idea of their workings in collateral fields or in variations of the same type of procedure. One could not work in an operating room without learning something about X-rays, or sterilization procedures. All education is similarly incomplete and even college training is but a bare smattering of generalities.

Section heads may say they can not divide their work into small units, but this can hardly be firmly adhered to, for systematic division of labor is the basis of all efficiency. It may be further argued by section heads that a man is no sooner trained and of some use than he is moved, but that is our problem, our task and duty, to efficiently train men.

From the standpoint of hospital management a systematized routine of assigning men is far simpler and far more saving in time and energy than all informal or personal choice methods. Consideration must be given to the question of seasonal expansion. In a general hospital the expansion is fairly equal in all departments except on the contagious wards, especially in the case of epidemics. But the latter are irregular emergencies for which no regular plan could be uniformly maintained; and in the former, if contagious wards were promptly cleared of chronic and late convalescent cases, there

would be little lack of balance. Local conditions, of course, must always be met and will be found to differ, but such a plan easily allows of minor variations. Furthermore, in considering any total complement, an allowance of 5 to 7 per cent must be made for those on the sick list.

The essential factors of good morale are found in the motor expression, i. e., behavior and conduct, of inward mental attitudes. In the normal, well-balanced mind this is created largely through material gathered from the activities of the self-regarding sentiment. While the various native instinctive dispositions demand expression, it is the self-regarding sentiment that makes for their proper sublimation into channels of social usefulness. Consciousness of self position is the beginning of social advancement. Such a plan as the one here proposed, accurately and persistently followed, caters to this sentiment by removing many of the difficulties so apparently incompatible with contentment, by making the many advantages stand out in clear relief, and by bringing up the necessary and ever present drudgery to such a degree of visibility that its limitation is readily realized to be surmountable and terminable.

When the apprentice begins his work in the new field of hospital life he is at once thrown into an apparently limitless mass of higher knowledge and work. It seems to be without beginning or ending and his profound ignorance sees no familiar factor upon which to fasten as a landmark, and from which he is to start for a goal so vague and so distant that there is no conscious recognition of a goal at all. He is soon overwhelmed by the lack of finiteness, by the absence of milestones in the environment to mark his progress toward this goal of which he as yet has not even a concept. His self-regarding sentiment soon brings to his consciousness the supposition that much is routine drudgery with little or no opportunity for worthy progress so far as he can see. He has no vision of a scope of years—he has not lived enough years wherefrom to judge. He measures time by months, yes, even by weeks and days, and evidence of the progress of self must appear to his consciousness in such easily understood time periods as months, weeks, and days. The apprentice who feels assured that at the end of 18 months he will have gained at least a general acquaintance with all types of hospital work, and who sees clearly his progress toward this, marked by passing from one section into another at regular intervals is going to have a better mental attitude toward the more dreary duties and toward the service than he who sees no definite assurance of change except that which is at random.

Lack of experience gained from making adjustments to new situations in the past makes life in the new hospital environment espe-

cially arduous if these adjustments have to be made to the institution as a whole at once. If, on the other hand, the necessary adjustments are narrowed down to a small section where all the work and associations are more or less related in kind, these are made with a minimum of difficulty and the man soon feels himself at home, a necessary cog in a small wheel which he later realizes is a part of a large machine. Thus dignity and responsibility are lent to the position. Increasing responsibility increases the interest. A beneficial, intensifying cycle is thus set up of increased interest, increased training, increased responsibility, greater creative effort and initiative, and again further increased interest. Opportunity is afforded for self-assertion expressed along beneficial lines. This is far more satisfactory than the vicious, dissembling cycle we see at times yielding little interest, little training, less responsibility, no creative effort and leading on to no interest, and producing a self-assertion expressed, too often, along antisocial and antiservice lines.

The interest of the individual soon spreads and develops into the interest of the group. A common group interest presages and maintains a common objective and a greater unification of ideas as against diversification. Minds that are interested and occupied with beneficial constructive ideas that clearly show self-development are not easily swerved into unhealthy activity of thought.

1. Scheme for integrating the various hospital services so that six different sections, each requiring approximately the same number of men, are obtained, which can be formed into a rotating schedule for training hospital apprentices.

2. There is an allotted period of three months' duration for each section.

3. This scheme is based on a complement of 132 men.

	Number of men.			
	Day watch.		Night watch.	Ward total.
	a. m.	p. m.		
SECTION I.				
Medical nursing:				
1. Acute medicine.....	6	6	2	14
2. Chronic medicine.....	3	3	2	8
Total section.....				22
SECTION II.				
Contagious medical nursing.....	8	8	6	22
Total section.....				22
SECTION III.				
Medically allied services:				
1. Sick officers' quarters.....	2	2	1	5
2. Psychopathic ward.....	1	1	1	3

Number of men.				
	Day watch.		Night watch.	Ward total.
	a. m.	p. m.		
SECTION III—continued.				
Medically allied services—Continued.				
3. Medical lock ward.....	1	1	1	3
4. Laboratory and morgue.....	4	3	0	7
5. Commissary department.....	2	0	0	2
6. Dietetics—Diet kitchen.....	1	0	0	1
7. Drug dispensary.....	1	0	0	1
Total section.....				22
SECTION IV.				
Surgical nursing:				
1. Clean surgical ward.....	2	2	1	5
2. Pus surgical ward.....	2	2	1	5
3. Bone and fracture ward.....	2	1	1	4
4. Eye, ear, nose, and throat wards.....	2	1	1	4
5. Genito-urinary ward.....	2	1	1	4
Total section.....				22
SECTION V.				
Surgically allied services:				
1. Main operating room.....	3	3	0	6
2. Small operating room, eye, ear, nose, and throat, and treatment room.....	2	2	0	4
3. Surgical treatment and dressing room.....	2	2	0	4
4. Surgical lock ward.....	1	1	1	3
5. X-ray department.....	2	0	0	2
6. Dental office.....	1	0	0	1
7. Sterilizer and linen room.....	1	0	0	1
8. Hydrotherapy room.....	1	0	0	1
Total section.....				22
SECTION VI.				
Hospital administrative services:				
1. General offices—				
Personnel.....	7	1	0	8
Material.....	2	0	0	2
File room.....	1	0	0	1
2. Master-at-arms force.....	2	2	2	6
3. Bag rooms.....	2	0	0	2
4. Hospital Corps quarters.....	1	1	0	2
5. Storerooms.....	1	0	0	1
Total section.....				22
Grand total complement.....				132

METHODS OF INSTRUCTING HOSPITAL CORPSMEN.

By W. M. KERR, Lieutenant Commander, Medical Corps, United States Navy.

A few years ago at the request of the council of the National League of Nursing Education, the committee of education undertook the task of preparing a curriculum which might serve as a guide for training schools for nurses desiring to establish good standards of nursing education throughout the country. The committee's endeavors resulted in the publication of *The Standard Curriculum for Schools of Nursing*, a book which contains the outlines of the various subjects which should be taught in a satisfactory course of study for nurses. In the portion of the book discussing the relation of hospital and training school organization to the standard curriculum there is a section which deals with "methods of good teaching" and as a knowledge of these methods will be helpful to those medical officers and their assistants who are responsible for the instruction of hospital corpsmen, especially at sea, a consideration of them as applied to the teaching of hospital corpsmen might not be amiss.

In the Hospital Corps of the Navy one meets with two classes of men. One is represented by the man who has joined the Navy perchance out of a spirit of adventure, and who intends to return to civil life at the expiration of his enlistment to follow some industrial occupation. In the other class we find the man who realizes the advantages of naval life and wishes to make service in the Hospital Corps of the Navy a career.

These men differ in their educational qualifications for the work which they have selected. Some have left school while in the grammar grades and have lost all interest in any educational advancement. They never make good hospital corpsmen and are generally eliminated from the Hospital Corps after they have demonstrated their unfitness. Others have been forced to leave school for various reasons before completing the course of instruction, but they possess the desire to advance and the ability to learn if properly directed. The large majority of these men leave the service at the end of their enlistment. Some remain and become competent petty officers. The rest, and unfortunately they are the fewest in number, are men who have graduated from high school and possess the mental qualifications which enable them to acquire readily the special knowledge which is necessary for their advancement in the Hospital Corps.

In order that a man be able to undertake the duties and responsibilities which meet him throughout the service, he must have not only a certain amount of sound knowledge, a high degree of technical skill, and the spirit of service and loyalty, but he must have a well-trained mind, good powers of observation, the ability to handle men and to manage affairs as they exist in the various branches of the

Medical Department of the Navy. The high school graduate, as a general rule, has the mental equipment which enables him quickly to possess these qualifications so essential to success in the hospital corps and, other things being equal, he may be expected to make more rapid progress than the man with a poor fundamental equipment.

All these men after entering the service start on an even footing. The distance each goes depends not only on the extent of his fundamental knowledge but on the teaching he receives. They become the assistants of medical officers at sea who depend upon them for the proper administration of all the details pertaining to the medical department of the ship, and in direct proportion to their proper instruction will they develop into competent assistants.

In most cases hospital corpsmen who are assigned to sea duty have graduated from one of the Hospital Corps schools where they have received the ground work of a hospital corpsman's education, and they have spent some months in a naval hospital where they have received instruction of a practical nature in the various branches pertaining to their work in the Navy. If the instruction which these men have already received is not kept up at sea, the medical officer can not expect to have competent assistants and the efficiency of his department will consequently suffer.

The test of teaching is found not in the reports of examination, but in the accomplishment of results by the pupil. There are a few fundamental tests which measure the quality of good teaching.

First. Where good teaching is being done, the pupils are interested in their work—they do not need to be driven to it by threats or bribes. The work is vital because it meets their needs, it helps them to solve their problems, and it arouses in them worthy and serious hopes and ambitions which persist in their future life.

Second. The pupils are doing real live thinking for themselves, and not merely memorizing facts. They are observing, comparing, judging, and learning to seek out reasons and to weigh conclusions. They show good sense and rational judgment in their handling of everyday situations, as well as in their class work. They relate their theory to their practice.

Third. The pupils show clearness and thoroughness of their knowledge by their ability to systematize and classify their ideas and to find them when needed. They do not simply accumulate masses of scrappy, unrelated facts. Their answers to questions, their class notes, and their methods of setting about a practical task will all show their ability to grasp essential points, to subordinate the unessential, and to focus all their resources on the problem in hand.

Fourth. Good teaching is shown by the degree of self-reliance, initiative, and resourcefulness developed in the pupils and their

ability to adapt and apply their knowledge to new situations. The pupil who is absolutely dependent on the teacher, who can not take any step without guidance and help will not be of much use in the hospital or in the service. The kind of teaching which substitutes tradition and authority for inquiry and investigation, which discourages mental activity and free self-expression and which destroys originality and initiative is no longer accepted as good in any branch of education.

The object of all Hospital Corps training is to create competent assistants to medical officers and to develop leading petty officers fully qualified for independent duty. In teaching hospital corpsmen we have always to keep clearly in mind the object of the teaching and plan our course accordingly. We must first decide just what we wish to accomplish through any given subject, and we must plan our work with this in mind. "We must study our pupils to see what kind of material we have to work with, and what foundations we have to build upon, so that the work may be neither above or below their capacity. We must select the subject-matter with these two things in mind and must then arrange an outline of work in each subject, divided into well-defined topics, which will receive attention in proportion to their relative importance."

An outline of the subjects which are required to be taught to hospital corpsmen should be available to all who are required by the regulations to teach. As an illustration of such an outline we may take any subject which can be taught in a short course, for instance, the following:

BANDAGING.

Time, 12 hours: Class demonstration, and practice in one-hour periods. Taught by chief pharmacist's mate.

Objects of the course.—1. To teach the fundamental principles of good bandaging as a basis for all future practice in connection with surgical work and first aid.

2. To develop a fair degree of manual dexterity and skill in the application of the commoner and simpler bandages in use in the Navy.

Outline of classes.—1. Introduction. Purposes for which bandages are used, materials used for bandages, varieties of bandages, methods of manufacture, principles observed in applying bandages, uses and common application of the various bandages.

2. The circular and spiral bandage and the spica (hand, arm, neck). Methods of holding, starting, and ending the roller bandage. Circular bandage of wrist, arm, and neck; spiral of the finger and arm; spica of the thumb; complete gauntlet of the hand and demigauntlet.

3. The spiral reverse and figure-of-eight of the arm. Purpose and technique of the reverse, spiral reverse of the arm, figure-of-eight of the arm and elbow, spica of the shoulder.

4. The spiral reverse and figure-of-eight of leg and foot. Spiral reverse of leg, spica of foot (covering the heel), figure-of-eight of the ankle, figure-of-eight of the leg, spica of groin (single and double).

5. Special bandages. Crossed bandages of the eye; Barton bandage of jaw; mastoid dressing bandage.
6. Recurrent bandage of the head; oblique bandage of the jaw; head and neck bandage.
7. Velpeau and modified Velpeau.
8. Sayre dressing for fracture of clavicle. Desault bandage.
9. Many-tailed bandages, four-tailed bandage, bandage of Scultetus, abdominal binder, suspensory for testicle.
10. Square neckerchief (triangular) applied to head, shoulder, hand, and foot; use as a sling. Cravat and cord, their application.
11. Adhesive plaster strapping of testicle, chest, lumbar region, ankle joint.
12. Application of plaster of Paris bandages. Materials used, reinforcement of cast, tension employed, setting of cast, dating of cast, removal of cast.

METHODS OF TEACHING.

1. The class period should be devoted to demonstration and practice, with criticism by the instructor. When the pupil has caught the right idea, the necessary extra practice to acquire speed and dexterity can be done outside the class.
 2. Hospital corpsmen may practice on each other, as the best results are obtained by having a human model.
 3. Books or charts with good illustrations of bandaging technique should be used freely by the pupils to supplement demonstration by the instructor.
- Equipment and illustrative material.*—1. Bandages of all varieties should be available for demonstration and for use by the pupils.

Reference books:

- Eliason, Practical Bandaging.
- Davis, Principles and Practice of Bandaging.
- Hopkins, The Roller Bandage.
- Wharton, Minor Surgery and Bandaging.
- Morrow, Immediate Care of the Injured.

"All good teaching requires time for preparation, and every detail of teaching should be planned ahead and not left to the spur of the moment. Slavish dependence on a textbook usually means slipshod, ineffective teaching. Rambling remarks, no matter how interesting, can never take the place of well-directed, clear-cut questioning and thoughtful discussion."

A lesson plan should be made out for each class. Taking up in the form of a well organized outline all the main points to be discussed such as may be seen in the following outline for the first lesson in bandaging.

1. Use of bandages.
 - (a) To hold dressings in contact with surface of the body.
 - (b) To make pressure.
 - (c) To hold splints in place.
 - (d) To maintain in their natural position, parts which have become displaced.
2. Materials used: Muslin, gauze, flannel, crinoline with plaster of Paris or starch, rubber, elastic webbing.
3. Varieties of bandages: Roller, square neckerchief, T-bandage, four-tailed, many tailed and Scultetus.
4. Methods of manufacture: Size, avoidance of seams, creases, or selvage. Bandage rolling machine. Hand rolling. Sterilization. Incorporation of plaster of Paris or starch.

5. Principles observed in applying.

- (1) Each turn should be applied smoothly to the surface.
- (2) Pressure exerted by each turn should be uniform.
- (3) When bandage is applied to limb, the position in which the part is to rest must be borne in mind, as pressure or constriction may arise from change of position.
- (4) Allow for possible swelling of injured part, hence, apply bandage loosely.
- (5) Allow for possible shrinkage of bandage when wet, hence, apply bandage loosely. A bandage applied over another, though no tighter, increases the constricting pressure.
- (6) Area covered. Use sufficient bandage to obtain desired result; do not waste material.

6. Uses and common applications of the various bandages.

- (a) Roller: Initial extremity, terminal extremity, body of bandage, foundation required. Method of starting. Method of securing end. Removal.
 - (b) Square neckerchief, from which are derived: 1. Triangular. 2. Cravat.
- 3. Cord.**
- (c) T-bandage. For perineum. For groin.
 - (d) Four-tailed. Temporary dressing for jaw or chin. For retaining dressings on scalp. Temporary dressing for fractured clavicle.
 - (e) Many-tailed. For holding dressings in contact with the abdomen or trunk.
 - (f) Scultetus. For the application of dressings where as little disturbance as possible is important in dressing part. Acute rheumatic fever. Compound fracture.

"The teacher should also have thought out beforehand his procedure in the teaching of the lesson, the important questions he is to ask, the blackboard illustrations he is to use, the devices and material for demonstration and the plan for the pupils' practice work, reference readings, study, etc."

The type of class exercise or recitation should be adapted to the subject taught, to the time available, and to the resources of the instructor. Those which are best adapted to the instruction of hospital corpsmen are as follows:

The lecture method.—"This takes the form of a talk or address by the teacher with no questions or responses by the pupil. It can be used profitably for introducing new material or arousing interest in a subject. It is economical of time, but is limited in its teaching value unless supplemented by other methods."

The recitation method.—"This covers a variety of class exercises—the drill, the quiz, the oral or written review, as well as the testing of assigned recitations. The problem method is a newer form of class exercise which is devoted to the discussion and solving of certain typical problems or situations which the pupil is likely to meet in actual life. Such methods help to maintain higher interest, help to clear up difficulties and test the actual knowledge of the pupil as well as develop the power of oral and written expression and judgment. One or more of these methods would be used alone or in combination with other methods in practically every lesson. Their suc-

cess depends on the skill of the teacher in putting live questions and directing discussions along profitable lines."

The demonstration or clinic.—"This is a lesson conducted at the bedside or in the demonstration room for the purpose of showing certain conditions or performing certain experiments or practical procedures for the class. It is especially useful in the presentation of medical subjects and, in combination with the two previous methods, is used in nearly all the scientific and practical subjects."

The laboratory method.—"Pupils here actually carry out experiments and practical procedures in order to get a more complete understanding of the principles involved and to gain skill. This method is used in combination with those previously mentioned in all scientific subjects (anatomy and physiology, chemistry, bacteriology, etc.) and in all the practical subjects (nursing, cookery, massage, etc.). It takes time, but is an extremely valuable and effective method of teaching if properly handled. No up-to-date school or college attempts to teach any science or art without providing laboratory facilities for each pupil."

The conference or case-study method.—"This is used with more advanced pupils who are capable of gathering together their own material and presenting reports on their observations or practical work, which are then discussed and criticized by the class and teacher." Such a method can be most profitably used in such subjects as clerical duties, commissary supervision, sick bay and ward management, supplies and property accountability, etc.

The study period.—"With the more immature pupils it is often found helpful to arrange definite periods of supervised study, with instruction in the method of study and demonstration in the use of reference materials, taking notes, etc. This is particularly necessary in the preparatory period where pupils have difficulty in acquiring the habit of study and where it is important to economize every minute of study time."

To hold the interest of pupils and to stimulate them to their best efforts, both in their theoretical and practical work, the instructor of hospital corpsmen needs to have a strong and vigorous personality and a fund of real enthusiasm for his work. He must be approachable and helpful in dealing with pupils, but at the same time should show a reasonable degree of firmness and decision in keeping them up to a proper standard of work.

The instructor should make it a point to know thoroughly the subjects he is to teach. It is not necessary to make this knowledge exhaustive, but it should be authoritative and up to date, and always well in advance of his class. He must be constantly refreshing and supplementing his knowledge by study and observation or his work will inevitably suffer. The teacher must also have a wide prac-

tical experience in the branches he teaches, and should be expert in demonstrating practical procedures.

The instructor of hospital corpsmen who has had no special training in teaching will find it very helpful to study the following books: *How to Teach*, by Strayer, G. C., and Norsworthy, N., Macmillan, 1917; *How to Study*, by McMurry, F. M., Houghton-Mifflin, 1909.

A good reference library is absolutely essential to satisfactory teaching of hospital corpsmen. It is not necessary that it be a large collection, but it should represent a fairly wide range of subjects. The books must be up to date and in good condition. It is very important that the students should have easy access to the reference books and that they should be encouraged to make the fullest possible use of them. Unfortunately the Bureau of Medicine and Surgery can not supply all of these reference books to ships, but a medical officer who is anxious to have his men progress might, with little expense, purchase a few desirable books, the use of which would be of great assistance to his pupils. Such a collection might contain the following, which the writer has found useful:

- An arithmetic, a grammar.
- Kimber. *Anatomy and Physiology for Nurses*. Macmillan, 1918.
- Bolduan and Grund. *Applied Bacteriology for Nurses*. Saunders, 1916. (No textbook for nurses covers this subject adequately.)
- Hiss and Zinnser. *A Textbook on Bacteriology*. Appleton, 1918.
- McPherson and Henderson. *Elementary Study of Chemistry*. Ginn & Co., 1917.
- Pope. *Physics and Chemistry for Nurses*. Putnam, 1918.
- Friedenwold and Rurah. *Dietetics for Nurses*. Saunders, 1917.
- Price. *Hygiene and Sanitation for Nurses*. Lea and Febiger, 1917.
- Pyle. *Personal Hygiene*. Saunders, 1918.
- Bastedo. *Materia Medica and Therapeutics*. Saunders, 1918.
- Stimson. *Nurses Handbook of Drugs and Solutions*. Whitcomb and Barrows, 1915.
- Maxwell and Pope. *Practical Nursing*. Putnam, 1914.
- Wharton. *Minor Surgery and Bandaging*. Lea and Febiger, 1913.
- Paul. *Nursing in the Acute Infectious Fevers*. Saunders, 1915.
- Howell. *Surgical Nursing and Hospital Technique*. Columbus Publishing Co., 1913.
- Eliason. *First Aid in Emergencies*. Lippincott, 1914.
- McMurry. *How to Study*. Houghton-Mifflin, 1909.

PLAN FOR A STANDARD TREATMENT OF VENEREAL DISEASE AS A PROPHYLACTIC MEASURE.

By W. D. OWENS, Lieutenant Commander, Medical Corps, United States Navy.

For convenience of description, venereal prophylaxis in the naval service may be classified as follows: 1. Social and moral measures. 2. Education of the naval personnel in regard to the venereal diseases. 3. Medical prophylaxis. 4. Punitive measures.

Under the title of "Medical prophylaxis" may appropriately be included adequate equipment and facilities for the scientific treatment of venereal diseases, organization and education of the personnel of the medical department for the medical care of venereal patients, preventive prophylactic measures, epidemiology, diagnosis, treatment, and cure.

During recent years the Bureau of Medicine and Surgery has made a continuous and progressive advance in the control and prevention of venereal diseases. The activities of the Division of Preventive Medicine of the bureau are directed toward an increasing control of all questions pertaining to the venereal diseases and every effort directed toward this end will develop a higher standard of accomplishment.

There need be no hesitation in stating that there is a growing need for such a procedure. Medical officers undoubtedly appreciate that in those ports most frequently visited by naval vessels there are particular prostitutes or girls whom the men of the Navy more often meet and associate with.

Assuming that these girls may be frequently infected by our men who have not been entirely cured, do these women in turn infect other men of the Navy? Evidence to this effect is not wanting, and valuable information could be obtained in this direction by the addition of appropriate questions to the venereal-disease questionnaire. There are under treatment aboard the U. S. S. *Mississippi* at this time 24 cases of venereal disease, and 21 of these men have stated that the girls who infected them were known to have had sexual intercourse with many other men of the Navy.

This does not necessarily incriminate the Navy with infecting these girls, but it establishes a situation which deserves our consideration. In a recent interview with the mayor of Bremerton, Wash., in regard to the local prevalence of venereal disease amongst our men, the mayor's defense was partly that the Navy was responsible in many instances for spreading infection. The mayor was shown how improbable this was in view of the venereal restricted list.

Naval vessels visit ports in all parts of the world. In some of these ports conditions which cause a high rate of venereal disease are notorious. In other ports the authorities satisfactorily control the situation, and venereal rates aboard our ships are low. In fairness to the public and to those authorities who make every effort to control prostitution in our behalf, we should give greater cooperation and assistance by developing adequate measures to establish noninfection before release from the venereal restricted list.

There are probably few medical officers of long service who have not seen, even in recent years, cases with infectious lesions of syphilis

at large incident to late or incomplete treatment. Again, it is not uncommon to observe cases of venereal sores recorded and treated a few days as chancroid and the diagnosis accomplished a few weeks later when the patient reported complaining of tonsillitis or an eruption.

In the case of gonorrhea the release from the venereal restricted list in an infectious or noninfectious condition depends upon the thoroughness of the test of cure performed by the individual who has the case in charge. The questions which naturally arise are: What test of cure is employed in the Navy, and is the method in every instance sufficient to insure a reasonable presumption that the patient is noninfectious? If a case of gonorrhea is released from the venereal restricted list merely because the discharge has stopped, one can not assume that the man is noninfectious, for such an incomplete test will miss the cases with an intermittent morning drop, or a recurrent discharge, and those cases in which the infective material is passed only during urination. Nor should a case of gonorrhea be restricted to the ship for weeks and even months because of the presence of epithelial shreds, for it is well known that shreds and even pus cells persist for years in a noninfectious individual. Medical officers undoubtedly recognize that our records in regard to gonorrhea are incomplete. We seldom have information as to the course or duration of the disease, whether the treatment is unnecessarily prolonged, or best meets the pathological lesions present. We have no record of when an anterior becomes a posterior urethritis, with the usual involvement of the prostate gland. Not uncommonly the original entry includes not only acute anterior and posterior urethritis but also anterior and posterior chronic urethritis. Finally, and this is of greater importance from a prophylactic standpoint, we do not know the test of noninfection which has determined discharge from the venereal restricted list.

The object of this partially standardized plan is to bring about a systematic endeavor to diagnose syphilis at the earliest possible time in order to promptly administer such treatment as will most likely render the patient noninfectious during the future course and treatment of the disease.

In the case of gonorrhea the plan provides for an early diagnosis, a more intimate supervision of the course and treatment, and the establishment of a standardized test of cure. The test of cure should call for a uniformity of examination with sufficient elasticity of requirements to meet the individual case. The evidence having been assembled, the medical officer from his professional knowledge and experience must give his own opinion as to whether or not the case is noninfectious.

There is another important reason for the standardized control of the diagnosis, treatment, and cure of venereal diseases. The war has brought about a vast increase in the number of destroyers, chasers, and submarine boats. These smaller units have mother ships with medical officers, but they are frequently on independent duty and whenever practicable their venereal cases should come under the observation and treatment of medical officers aboard the larger ships with which they may be associated.

It probably requires more professional knowledge and experience to correctly diagnose a case of syphilis before the employment of the Wassermann test than it does to diagnose the early stage of diphtheria or epidemic meningitis and it is during this pre-Wassermann stage that so much may be accomplished to render the patient noninfectious by the administration of neoarsphenamine. Likewise, it requires no less skill to determine the chronic gonorrhea carriers than it does to diagnose the diphtheria or epidemic meningitis carrier, and until we place the diagnosis, treatment, and test of cure of venereal diseases upon the same high standard which is required for other communicable diseases, we will fail to meet the advances demanded of venereal prophylaxis.

In order to provide a greater uniformity of procedure in the diagnosis, treatment, and standardization of noninfection of venereal disease aboard the U. S. S. *Mississippi*, two urologic abstracts have been adopted. They offer attractive advantages to the medical officer in following the cases and it is believed that their general employment would be of considerable value to the bureau and to fleet surgeons and other medical officers having the supervision of venereal diseases.

It is not intended that these abstracts shall interfere with the present nomenclature or methods of recording venereal diseases but that they will be in addition to the present entries required and considered in the light of prophylactic information.

Possibly the best manner of presenting the various reasons for the data given on these abstracts is to give the standardized scheme of procedure with gonorrhea and syphilis which is employed on board the U. S. S. *Mississippi*.

The patient reporting with possible gonorrhea, the discharge is subjected to an examination for the presence of gonococci. Both methylene blue and Gram's stains are employed to demonstrate the gonococcus. The patient having been positively diagnosed as having gonorrhea he is then instructed by means of an anatomical chart as to the usual course of the disease. The lesions which may be anticipated from an infection of the urethral glands, the prostate, the vesicles, the epididymis, and testicles are indicated.

The necessity of drinking an excess amount of water in order to frequently lavage the urethra is explained. Printed instructions detailing how to take injections are given each case and the usual sanitary precautions mentioned.

During the first three weeks or until posterior urethritis develops as shown by the two-glass test, an especially instructed hospital corpsman follows the injections and once a week submits the two-glass test to a medical officer for observation.

With the appearance of posterior urethritis, irrigations are started. For this purpose a soft-rubber catheter is used to fill the bladder with two or three hundred cubic centimeters of 1 per cent solution of mercurochrome-220. Apparently excellent results are obtained from this solution, but it has the disadvantage of staining everything it comes in contact with, and the stains are oftentimes difficult or impossible to remove.

After six weeks' duration the case is recorded as chronic urethritis, and a medical officer then determines the advisability of instrumental and prostatic examination to detect, if possible, lesions which may prolong the period of infection. In every case so far treated under this plan the prostate has been examined and a bougie à boule been passed to elicit beginning areas of infiltration or erosion. In a few instances the urethroscope has been employed, but only in cases of long duration with little or no discharge.

Diagnosis of the predominant lesion or lesions which influence the chronic course is essential but an absolute therapeutic conclusion can rarely be drawn. It not infrequently happens, however, that a prolonged and over severe treatment if corrected will bring about a cure. It is in this direction that a history of the case, as presented on the abstract, affords considerable advantages in making a decision. When the clinical manifestations indicate an apparent cure the case is then subjected to the final test of noninfection.

The patient who can successfully meet the test here given is, in the opinion of authorities, considered noninfectious. It is only presumptive evidence of cure but from a limited experience it appears to be practical and sufficiently simple to satisfactorily meet service conditions. Every medical officer recognizes that the prostate affords likely and persistent sites of infection in the apparently cured, hence we should not fail to examine the massaged secretion of this gland before release from the venereal restricted list.

One of the factors called for in this test is the presence of shreds. A case has been known to have remained on the venereal restricted list for seven months and the only evidence of infection when seen, was the presence of epithelial shreds in the urine. The occurrence of epithelial shreds, and even a few pus cells, is not acceptable evidence that the case is infectious.

Pus cells and pus shreds are more worthy of consideration but are by no means positive evidence. After all, the finding of the gonococcus is the only definite sign of continued infection, but on account of the difficulty of its demonstration in late cases other measures must be considered. Keyes states that when the epithelial cells are in excess of the pus cells the case may be considered noninfectious.

This question has been added to the test of cure but whether it is based upon experience or upon laboratory findings is not known. In this series of cases, men are not uncommonly released from the venereal restricted list having twice as many pus cells as epithelial cells. The information elicited from the test of cure is recorded and an individual estimate made of each case to determine noninfection. Even with a standardized test the medical officer should be the final judge of noninfection.

In developing a partially standardized plan of treatment for early syphilis from a prophylactic standpoint, the following postulates have been adopted. 1. It is of paramount importance to diagnose the primary lesions of syphilis at the earliest possible time, if possible before the availability of the Wassermann test. 2. Every venereal sore upon the genitals must be regarded with suspicion and examined for *spirochæta pallida* and when these organs can not be demonstrated after careful search, the patient should have consecutive, periodic Wassermann tests for three or four weeks until the question of syphilis is definitely determined. 3. No case of syphilis should be subjected to treatment until a positive diagnosis has been established. 4. That if administered early enough, six weekly injections of neoarsphenamine intravenously will render the patient noninfectious during the future course of the disease if followed with even an indifferent treatment.

In an effort to comply with these four postulates in a systematic manner the venereal sore urologic abstract has been developed into 10-day diagnostic periods. The decision of a positive diagnosis during each period must be determined by the evidence assembled during that period. The only single positive diagnostic sign is the demonstration of the *spirochæta pallida* taken from a suspicious lesion.

During the first 10-day diagnostic period the incubation, induration, and regional adenitis may be strong presumptive evidence, but unless the *spirochæta pallida* is found the diagnosis can not be accepted. In like manner during the second 10-day diagnostic period the clinical signs alone should not establish the positive diagnosis unless occurring in conjunction with a positive Wassermann test or a positive *spirochæta pallida* finding. Nor should a positive Wassermann without fairly characteristic symptoms of the primary lesion

be accepted as definitely establishing syphilis. The appearance of the secondaries and the positive Wassermann are excellent evidences of syphilis, but even so the characteristic signs and history of the primary lesion should be known, if one would avoid mistakes.

Recently a case came under observation with a suspicious eruption and a positive Wassermann test, but the patient presented no evidence of a primary lesion. The patient was considered to have a typical case of pityriasis rosea and subsequent negative Wassermanns and the course of the disease definitely established this opinion.

The mission then, with early syphilis, is to assemble as soon as possible such diagnostic evidence as will establish a positive diagnosis, and when this has been accomplished to administer a course of treatment which will render the patient noninfectious.

It is believed that six weekly administrations of neoarsphenamine will accomplish this mission.

UROLOGIC ABSTRACT.

(GONORRHEA.)

(Enlisted men only.)

To be inserted when required next to abstract of health record and follow same course. Entries on this sheet are additional to and in no way replace medical history.

The nature of gonorrhea has been explained to me. The reasons for wearing a supporter, the necessity of keeping the bowels open and of drinking an increased quantity of water have been indicated. I have been told that prolonged treatment with frequent tests of my urine, examination of the prostate and the seminal vesicles will be required before I can be sure that I am cured. Instructions have been given me detailing how to take injection and the usual sanitary precautions have been explained.

(Date)

(Signature of patient)

DIAGNOSTIC EVIDENCE.

DATE	EVIDENCE
_____	Exposed_____
_____	Appearance of discharge_____
_____	Gonococci demonstrated_____
_____	Methylene blue_____
_____	Gram stain_____
_____	Complement fixation_____
_____	Culture_____

GENERAL PHYSICAL CONDITION.

COMPLICATIONS

RESULTS OF TREATMENT

FINAL EXAMINATION UPON DISCHARGE FROM VENEREAL RESTRICTED LIST (REQUIRED IN EVERY CASE.)

Has patient a urethral discharge? _____

If a discharge is present, is it free from gonococci? _____

With the two-glass tests are both glass 1 and 2 clear and free from pus shreds (epithelial filaments may be disregarded)? _____

Does the secretion by massage of the prostate and seminal vesicles show no gonococci and not more than five leucocytes per field? _____

Are the number of epithelial cells in excess of the pus cells? _____

This test will be made after vigorous exercise on the day previous to examination and after retention of urine for at least two hours. No case will be taken off the venereal restricted list until pronounced noninfectious.

(Sig. M. O. Making Examination.)

REVERSE.

Abstract of treatment of (name)

ANTERIOR URETHRITIS.

Place.	Course.	Average number of daily injections.		2-glass test.		Internal treat.	Remarks.	Sig. of med. officer.
		Solution.	Number.	1st.	2nd.			
.....	1st week.....	.....	.....	.....	.....	.....	.....	.....
.....	2nd week.....	.....	.....	.....	.....	.....	.....	.....
.....	3rd week.....	.....	.....	.....	.....	.....	.....	.....

POSTERIOR URETHRITIS.

Place.	Course.	Number of irrigations weekly with		2-glass test.		Urethral discharge.		
		Solution.	Number.	1st.	2nd.			
.....	4th week.....	.....	.....	.....	.....	.....	.....	.....
.....	5th week.....	.....	.....	.....	.....	.....	.....	.....
.....	6th week.....	.....	.....	.....	.....	.....	.....	.....

REVERSE—Continued.

CHRONIC URETHRITIS (cases of more than six weeks duration. State probable cause).

Place.	Course.	Number of irrigations weekly with		2-glass test.		Internal treat.	Urethral discharge.	
		Solution.	Number.	1st.	2nd.			
.....	7th week.....	.....	.....	.....	.....	.....	.....	.....
.....	8th week.....	.....	.....	.....	.....	.....	.....	.....
.....	9th week.....	.....	.....	.....	.....	.....	.....	.....
.....	10th week.....	.....	.....	.....	.....	.....	.....	.....
.....	11th week.....	.....	.....	.....	.....	.....	.....	.....
.....	12th week.....	.....	.....	.....	.....	.....	.....	.....

INSTRUCTIONS FOR TAKING INJECTIONS.

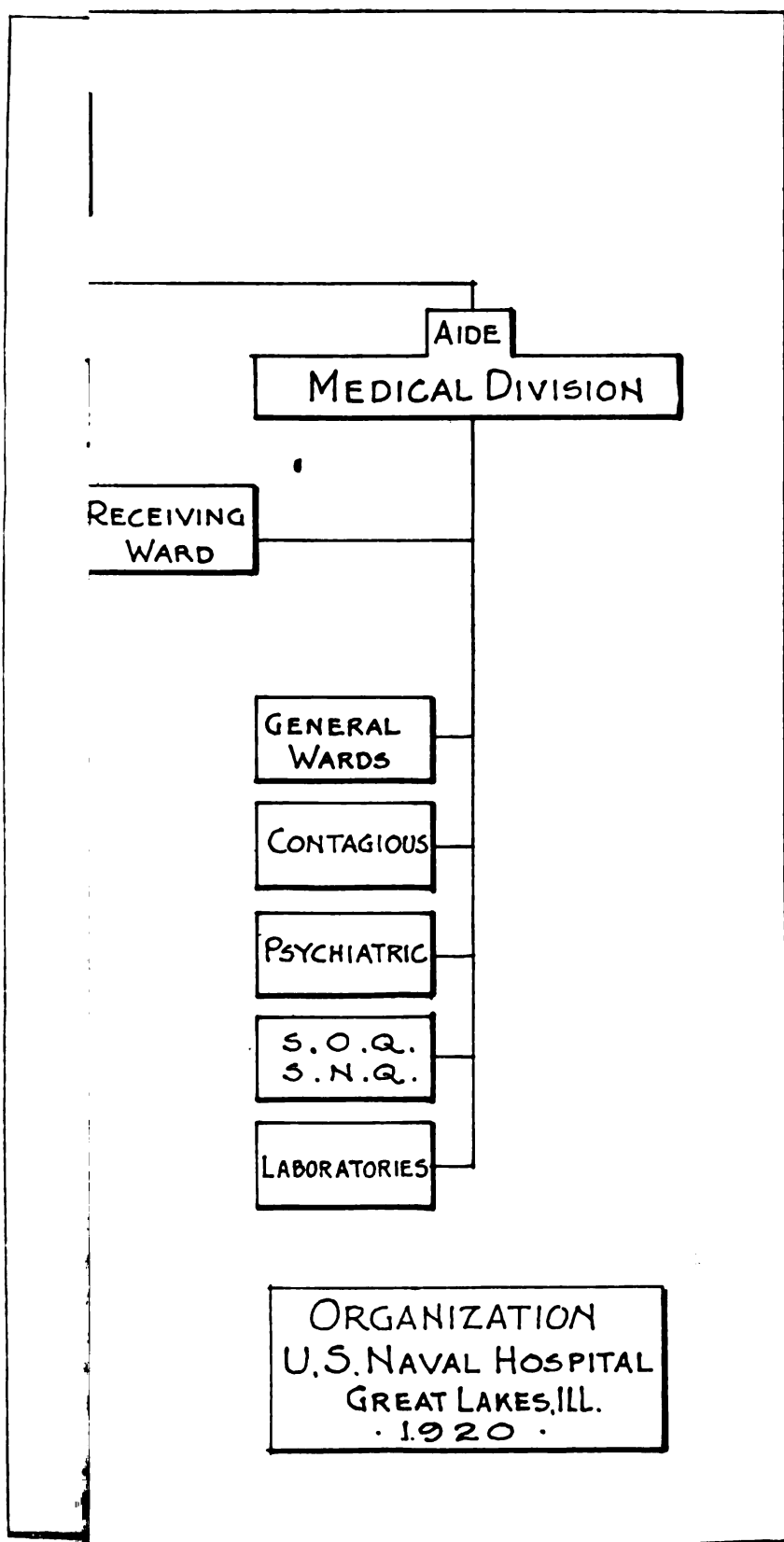
1. Urinate.
2. Locate hand syringe in disinfecting jars, disinfecting medicine contained in glass jars, and basin of warm water. This wash should be as warm as you can stand it within the penis, without undue pain.
3. Stand or sit so as to avoid soiling clothes.
4. Fill syringe with hot water from basin.
5. Draw back foreskin and clean head of penis well with hot water from syringe.
6. Grasp penis behind the head with thumb, first, and middle fingers of left hand, so as to hold the organ firmly.
7. Refill syringe with hot water and place it to mouth of urethra (penis). Slowly squeeze bulb of syringe until there is a feeling of fullness or slight pain. Hold hot water in urethra (penis) from one-half to one minute. Then remove syringe from mouth of urethra and let out water. Do this 5 or 6 times, or until water returns clear. Never fill the urethra suddenly because the inflamed and swollen lining might tear. The urethra is washed out in this way in order to get all the discharge from between the folds in this canal, so that when the medicine is injected it will come in direct contact with all the inflamed area.
8. Fill syringe with medicine for injection. (Date ————. Solution ————.) Grasp penis as directed in 7, and inject the medicine slowly until there is a feeling of fullness or slight pain. When injection is in canal place first finger over mouth of urethra to keep in the injection, which is to be held for five minutes, or for as long a time as the doctor directs.

**PLAN OF ORGANIZATION FOR A NAVAL HOSPITAL OF 300 BEDS AND OVER
AS UTILIZED AT GREAT LAKES, ILLINOIS, 1920.**

By R. P. CRANDALL, Captain, and W. A. ANGWIN, Commander, Medical Corps, United States Navy.

Hospital management during the war, with its problems of expansion and accommodation to new conditions, revealed many defects in our prewar system of hospital organization. The old system was easily adaptable to any small unit or hospital of 250 beds and under, but failed to work when the business of the hospital spread beyond the one-man scope.

These war experiences are of value and the basic principles of the organization then used in the various hospitals should be preserved and utilized for our present and future hospitals. If necessary the



regulations should be altered to meet the changed conditions. Every one of the Navy hospitals that had to expand had to leave the regulations behind and strike out along new lines. Eventually these lines converged into very similar avenues, and the organization of nearly all of our big hospitals is now quite different from the prewar organization. The conception is broader with more scope for individual action and more channels for advancement along professional and administrative lines.

The old idea that the executive surgeon should be the officer next junior to the commanding officer was abandoned early and for the first time officers could look ahead to a period of professional usefulness without the likelihood of this activity being cut off just at the time of their official life when their experience and judgment were becoming of professional value.

In the accompanying organization as used at Great Lakes, the title of executive officer is retained in order to comply with existing regulations. The officer next junior to the commanding officer retains this title with function of liaison officer. His other duties are along the line for which he is found best fitted professionally. The senior officer (next to the commanding officer) may be the office executive, that is, the administrative aid, or he may be the head of any one of the hospital departments, according to his talents. The administrative aid becomes what his title suggests and is responsible to the commanding officer for his actions. At present he is responsible through the executive officer to comply with existing regulations; but efficiency demands that he be given the responsibilities of his position.

The plan of organization is submitted in the hope of bringing out constructive criticism and with the desire to retain permanently the lessons learned in the war.

DETAILS OF ORGANIZATION.

General organization.—For the purposes of administration, all hospital activities are divided into three general divisions. (See graphic chart.)

- A. Administrative division.
- B. Surgical division.
- C. Medical division.

All subjects dealing with the relation of the hospital to any other naval or any external organization will be handled directly by the commanding officer's office. This will include relations with civic organizations, Red Cross, welfare work, etc.

The executive officer has general supervision over all departments and acts as liaison officer between the divisions. The officer next junior to the commanding officer will be the liaison (executive) officer.

A. *Administrative division*.—The chief of division will be designated as administrative aid. This division has charge of all subjects relating to the internal organization of the hospital.

(a) *Maintenance and repair section*. Under this section are included maintenance, construction, repair, general upkeep, current material activities, care of buildings and grounds, civil employees and their duties, designation of pay, hiring and discharging, and quarters.

(b) *Hospital personnel*. Under this section come all questions of duty or detail, liberty, leave, or restriction and discipline. It includes the assignment of officers to general duties, courts and boards, or other special duty or as officer of the day; general supervision of the Nurse Corps and its organization and activities under the chief nurse, the dietitians, housekeepers, and female employees and their quarters; direct charge of the Hospital Corps and patients, their discipline, detail, and liberty. It is assisted by the master-at-arms.

(c) *Inspection section* is the connecting section between the other two. It is assisted by two inspectors. It includes all personnel, their activities and abilities; all hospital buildings, power houses, shops, stables, garages, barracks, living quarters, warehouses; all grounds, shrubbery, roadways, walks; all systems of piping or wiring; all transportation conveyances, etc.

(d) *Office section*: 1. The record office has charge of all general correspondence arising from any office and files of same; all records of personnel, including Medicine and Surgery reports and returns, Navigation reports and outside correspondence relating thereto; has contact with detail office, main station in regard to admission and discharge of patients, has control of bag room and baggage of personnel. The personnel officer witnesses payments to enlisted personnel. 2. The material office has charge of purchase of all supplies for hospital, including requisitions, bids, and awards; all storeroom and stores other than commissary; care and shipment of deceased; dispensary and medicines and has contact with the main station supply office, disbursing office, public works office, and morale office. Matériel officer witnesses payments to civilian employees. 3. The commissary has charge of foods, their inspection, storage, preparation, and distribution; care, upkeep and cleanliness of galleys and mess halls (except diet kitchen); detail of civil employees and detailed persons; and care of commissary ledger. 4. Post office and handling of mail. All incoming official mail is delivered to the commanding officer and routed by his office.

B. *Surgical division*.—The chief of this division will be designated as the surgical aid. The division will have charge of all professional activities of a surgical nature and the necessary equipment

for same, including general surgery, urology, eye, ear, nose and throat, X-ray, and dental sections.

C. Medical division.—The chief of this division will be designated as the medical aid. The division will have charge of all professional activities of a medical nature and the necessary equipment for same, including general medical, contagious, tuberculosis, psychiatric, and laboratories.

DAILY ROUTINE.

6.15 a. m.—Reveille.

6.30 a. m.—Hospital corpsmen muster.

6.35 a. m.—Hospital corpsmen drill.

7 a. m.—“Short day” hospital corpsmen relieve “night” hospital corpsmen in wards.

7.30 a. m.—Breakfast. Hospital corpsmen relieve each other in wards. first relief 7.30, second relief 7.45. Night hospital corpsmen breakfast.

8 a. m.—Breakfast for chief petty officers staff. Regular liberty expires. All hospital corpsmen returned from liberty and office details report for duty.

8 a. m.—Officers’ breakfast.

9 a. m.—Sick call in all wards.

12 noon.—Dinner for patients and hospital corpsmen; hospital corpsmen relieve each other in wards.

12 to 12.30 p. m.—Officers’ dinner.

12.30 p. m.—Dinner for chief petty officers staff.

1 p. m.—Wednesday, Saturday, and Sunday liberty parties depart.

2 p. m.—First school hour for hospital corpsmen.

3 p. m.—Second school hour for hospital corpsmen. “Short day” hospital corpsmen off duty.

4.30 p. m.—Week day liberty party departs.

5 p. m.—Supper for officers, patients, and hospital corpsmen.

5.30 p. m.—Supper for chief petty officers staff.

7 p. m.—Officer of the day’s sick call.

9 p. m.—“Day” hospital corpsmen relieved by night details. All wards quiet and patients in bed. All lights out except “standing lights” in wards.

10 p. m.—Officer of the day’s inspection. All lights out in sick officers’ quarters, except those lights authorized by the officer of the day. Lights out in all buildings and barracks.

11.15 p. m.—Midnight supper for night crew.

12 midnight.—Midnight supper for officers and nurses.

WEEKLY ROUTINE.

Work to be done in all departments in addition to general routine.

Monday.—General cleaning of all woodwork, including service rooms, toilet, and quiet rooms. All spots removed from deck. Refrigerator scrubbed and scalded.

Tuesday.—High dusting and radiators thoroughly cleaned. Lights cleaned. Ward detail sent to executive office.

Wednesday.—Requisition and draw stationary supplies from chief nurse’s office at 9 a. m. Send requisition for ward supplies and cleaning gear, survey slips to chief nurse’s office at 9 a. m. All windows to be washed.

Thursday.—Lockers and chairs scrubbed. Clothes rolled per regulation and stowed neatly in locker. Refrigerator scrubbed and scalded. Ward supplies and cleaning gear drawn from basement storeroom between 10 a. m. and 11 a. m., and from warehouse between 1 p. m. and 2 p. m.

Friday.—General field day. Beds cleaned and kerosene to springs; air beds until 10 a. m. Examine beds and bedding for vermin. (If bugs are found, report same to chief nurse, clean bed frames with soap and water and wipe springs and cracks with kerosene. Send mattress and bedding to sterilizer.) Change all bed linen. Hospital corpsman report to chief nurse's office. Ward detail sheet to executive office.

Saturday.—Get ward in order and men in uniform of the day and be ready for inspection at 10 a. m. Narcotic book and blanket count to chief nurse's office by noon.

NOTE.—Garbage and trash cans are scalded at incinerator every day. Report any laxity to chief nurse. All beds, chairs, and lockers moved once a week and deck waxed and polished with machine according to schedule. Decks polished every morning with hand polisher.

FIRE ALARM FIRE DRILL.

The alarm will be one long blast on the steam whistle of power house No. 27, followed by short blasts to indicate the number of the fire box from which the alarm was turned in. These numbers will be repeated twice. The engineer in charge of power house No. 27 will stand by to repeat fire call more frequently if necessary. Secure will be sounded by two long blasts on the steam whistle.

The person discovering the fire will immediately endeavor to extinguish it by the use of the nearest means at hand, such as suffocation by blankets or other material, use of water, or the nearest hand fire extinguisher or pyrene outfit. He should at the same time pass the word "Fire" to anyone in the neighborhood and in case the fire becomes unmanageable should turn in the alarm at the nearest fire box found inside the unit buildings. Do not turn in a fire alarm from the boxes erected on posts on the roads. These are connected with the fire system on the main station and not with that of the hospital. At the same time a telephone call will be sent to the switchboard operator as to the location of the fire.

The switchboard operator will notify by telephone the officer of the day, administrative aid, and the commanding officer as to the location of the fire.

The administrative aid will take charge at the scene of the fire. The assistant inspection officer will report to the scene of the fire and act as first assistant. In their absence the officer of the day will take charge at the scene of the fire.

The officer of the day (and assistant officer of the day) will stand by in the officer of the day's office to answer telephone calls and to be called to the scene of the fire if necessary. He will send two messengers to the scene of the fire to report to the administrative aid for duty. He will take precautions at the same time to assure himself that provisions have been made for the release of prisoners and confined prisoner patients. He will call the officer of the day, main station (local 1, terminal 3) and notify him of the fire or drill. If unable to get the officer of the day, call the fire chief (local 101).

The ward officers will immediately report to their wards and prepare for the removal of patients and records. The ward should be organized for fire, so that the nurse, hospital corpsmen, and patients will know the location of the extinguishers. Stretcher or carrying parties of four ambulant patients will be

detailed. At the time of fire the stretcher parties will stand by in the ward for call. Pyrenes and fire extinguishers will be taken charge of by hospital corpsmen. Windows and doors will be closed. In case a stretcher party is needed at the scene of the fire, the ward will be called by telephone or messenger, and the stretcher party will be sent immediately on the double. All ambulant patients shall report immediately to their wards. The hospital corpsman in the psychiatric unit will stand by to release confined patients, ward and division officers will see their departments are secure, and that all necessary steps are taken to remove inflammable records and property.

The fire party. The fire truck will be manned by a driver from the garage, chief plumber, and two assistant plumbers. No more than four persons are to ride on the hose truck. When the truck arrives at the scene of the fire, the hose will be broken out and the fire extinguishers taken off the truck.

Hose cart No. 1, in the rear of the main hospital, will be manned by the civilians from the main galley force and taken to the scene of the fire.

Hose cart No. 2, in the Ross hose house, will be manned by the personnel of the Ross power house, who will stand by for call if fire is in the main group or will repair to the scene of the fire if it is in Ross.

Civilian employees. Ice-plant man will stand by main station valve. Carpenters are to go to the scene of the fire with hammer, ax, saw, and crowbar; electricians, with pliers and rubber gloves; plumbers and steam fitters, with Stillson wrenches. Engineers will stand by power house, haul fire in case of fire in boiler room. Engineer in power house No. 27 will sound alarm. Cooks will draw fires in case of actual fire in their own galley, otherwise close windows and stand by. Main-galley man mans hose cart No. 1 and goes to the scene of the fire. Night watchman sounds alarm and notifies officer of the day.

The master-at-arms and one assistant master-at-arms will repair to the brig to stand by to release prisoners.

GENERAL WARD MANAGEMENT.

6.30 a. m.—Laboratory specimens collected and taken to laboratory.

7 a. m.—“Short day” hospital corpsman reports for duty, relieves night man for breakfast.

7.30 a. m.—Breakfast served in wards.

8 a. m.—Day nurse reports for duty relieving night nurse. “Long day” hospital corpsman reports for duty. Check up day register; order diets for the day; send in morning report; take temperatures, serve medicines. Hospital corpsmen and patients get into the uniform of the day for sick call. Order drugs and other supplies from dispensary. Soiled linen is counted and sent to laundry. Routine care of all bed patients. Deck is swept and polished and then given final sweep. Lockers, chairs, beds, window sills, etc., wiped off. Draw ice allowance.

9 to 10 a. m.—Sick call by ward officer. The nurse and hospital corpsman in charge of ward will accompany medical officer holding sick call. All orders written in the treatment book will be initialed by the medical officer in charge of ward. Absentees reported by the nurse, in charge of the ward, to officer of the day, who will report all absentees to the administrative aide at the time the journal is submitted for examination. Diet orders sent to commissary. Drug book sent to dispensary. Tuesday and Friday, ward detail sheet sent in. Linen received from linen room. Head, galley, and all side rooms given a thorough cleaning. Beds, chairs, lockers, etc., arranged in order. Surgical dressings done by ward officer, assisted by hospital corpsman. Fruit and milk allowance drawn from commissary.

11.30 a. m.—Serve dinner to patients in wards.

12 noon.—Dinner for convalescent patients and hospital corpsmen. Clean up after dinner.

1 p. m.—Get supplies and drugs for dispensary. Write up orders (if any) for each patient in the day order book (to be turned over to the relief nurse at 3 p. m.). Fresh dressings, gloves, etc., are prepared and sent to operating room for sterilization. Patients' clothes drawn from bag room if needed (1 p. m. to 4 p. m.).

3 p. m.—Afternoon nurse reports for duty, relieving day nurse. Temperature of all bed patients.

4 p. m.—Medicine given, dressings renewed, supper served to patients in wards. "Short day" hospital corpsman relieved from duty.

5 p. m.—Top of lockers cleaned, deck swept, head straightened, dishes washed, galley straightened, medicine given.

6 p. m.—Backs rubbed, beds straightened, temperatures taken, cathartics given, medicine and evening dressings.

7 p. m.—Sick call by the officer of the day.

8 p. m.—Charting done.

9 p. m.—Night orders written up. Instructions to night hospital corpsmen, day hospital corpsmen relieved from duty by night men. Medicine given. Nourishment to liquid-diet patients.

10 p. m.—Day nurse relieved by night nurse. Inspection by the officer of the day. Night nurse makes up 10 p. m. muster with hourly checks during night; report sent in duplicate, one to officer of the day, and one to Chief Nurse at 8 a. m.

Medications: Ordered q. 4. h. are given at 8, 12, 4, 8, etc.; q. 3. h. are given at 6, 9, 12, 3, 6, etc.; t. i. d. are given at 8, 2, 8.

Temperatures ordered q. 4. h. taken at 8, 12, 4, 8, etc.; b. i. d. taken at 6 a. m. and 4 p. m.

WARDS.

Visiting hours.—2 to 4 p. m. No visitors will be permitted in any contagious ward or venereal ward.

Supplies and surveys on property.—Property accountability cards for material for survey will be brought to the office of the chief nurse on Wednesday for her signature before 10 a. m. Those cards will not be signed by the administrative aid. Property accountability cards for new issue will be brought to the office of the chief nurse on Wednesday before 10 a. m. for her O. K. They will be retained by the chief nurse and sent to the administrative aid for his signature. They will be returned to the wards by messenger. All issues of material will be made on Thursday between 1 and 2 p. m. from the main storeroom.

No property of any kind will be transferred from one ward or department to another without the transfer going through the proper channels. This applies particularly to transfers made at night in emergencies. If blankets or other articles are needed they should be drawn from store and not taken from supply in some ward or department. The officer making such irregular transfer in an emergency will pass a receipt to person from whom he gets the article and will personally take up the transfer with the proper department at the earliest possible moment after the emergency has passed.

Medicines.—All requests for medicine and supplies from the dispensary must be in the dispensary by 10 a. m. These articles will be called for between 1 and 2 p. m., not later than 2 p. m.

Emergency prescriptions will be filled at any time when the dispensary is open and at night by the chief petty officer on watch. The dispensary will be closed at 6 p. m. All chief petty officers will familiarize themselves with the dispensary and location of medicines therein.

No plain alcohol will be used in the wards for other than surgical purposes. Wards desiring alcohol for rub-downs will be furnished by the dispensary with an alcohol liniment (special formula). No surgical ward will be allowed more than 500 c. c. alcohol per day.

All alcohol and narcotics ordered for a ward will be ordered on the ward drug book and will be written in red ink. No alcohol or other narcotics will be issued without the signature of the chief nurse. A small book has been issued to each ward in which the amount of alcohol and narcotics drawn and expended during the week will be recorded and sent to the office of the chief nurse every Saturday by noon.

Nurses or hospital corpsmen in charge of wards will be held strictly responsible for the administration of drugs and treatment. Poisons and liquors must be kept under lock and key.

Milk.—The allowance of milk per patient getting liquid diet or soft diet is 1½ quarts per day. If ward officers desire they may order dally in individual cases milk for regular-diet patients up to 1 quart each daily. No cream will be drawn for use in wards. No cooking will be allowed in wards except for toast.

Rations.—No rations will be drawn for hospital corpsmen on duty in the wards unless restricted. All hospital corpsmen not restricted to the ward will mess at the galley No. 1 mess hall.

Uniform.—All hospital corpsmen on duty in wards will be in white uniform at all times while on duty. No unusual uniforms or combinations of uniforms will be permitted. Strict attention will be given to the appearance of patients in the wards. When patients are not actually on duty or when outside of the wards they will be in the uniform of the day. Ward officer will inspect patients and see that they have regulation hair cuts and that they are cleanly shaved and clothed.

Liberty.—The liberty party will be formed and mustered by the master-at-arms in the basement or in front of the hospital, as the weather may permit. After muster the liberty party will be inspected by the officer of the day personally, who will refuse liberty to any patients found out of the uniform of the day and whose appearance is not tidy. Special attention will be paid to hair cuts, shaves, regulation uniforms, extra articles of clothing not specified by regulations, and shoes. The uniform for liberty will be the same as the uniform of the day on the main station. The officer of the day will be strict in compliance with this order. Men on liberty list not complying with these orders will not be given the privilege of reporting back again after they have cleaned up.

Patients having gonorrhea, gonorrheal rheumatism, or any open venereal lesion will not be granted liberty. No person admitted with severe nervous or mental diseases, epilepsy, etc., is to be recommended for liberty. Patients with diagnosis of constitutional inferiority are to be considered in this class and are not to be granted liberty unless there is good reason to believe that they can handle themselves under ordinary circumstances.

When a man returns after being absent without leave for more than 24 hours, unless there is some reason to the contrary, the officer of the day will turn him over to the master-at-arms for safe-keeping. When men are returned to the hospital by a sentry they will be inspected by the officer of the day as to their condition, and the circumstances of their arrest will be fully noted. Such men

will be placed in the brig for safe-keeping until action can be taken on their cases by the commanding officer.

The details for liberty and light duty must be consistent with each other. It will be understood that patients recommended for liberty are available for light duty, their disease or injury being taken into account. When patients detailed to light duty are put to bed by the ward officer the administrative aid must be notified at once, giving the man's name, rate, and where detailed.

Contagion.—The hospital corpsmen detailed to scarlet fever, measles, and other acute contagious wards will be quarantined, will sleep in the ward, and will not be granted liberty until their tour of duty is up.

Wassermann tests.—Requests for routine Wassermann tests must be made before 9 a. m. Tuesday. All ambulant patients for Wassermann tests will report promptly at 9 a. m. Tuesday. Wassermann tests made on Wednesday will be returned on Thursday. Wards will be careful to see that all routine urine specimens are at the laboratory at 8 a. m.

Grounds.—Wards will be responsible for the policing of grounds adjacent to them. This policing shall include from the curbing of the street on either side of the ward or from the fence, if adjacent to fence, and halfway to the next ward. This area will be policed and cleaned as often during the day as necessary. Nurses will caution patients not to throw articles out of the windows of the wards. Wards will be held strictly responsible for the cleanliness of grounds in the areas above referred to.

Refuse.—All diet kitchen food refuse must be kept in separate containers and kept clean, because this material is sold by contract as food for animals and contractors refuse to accept any except clean garbage. Paper and tin cans, sputum cups, or other ward debris must not be mixed with food refuse. Food refuse will be taken to garbage cans on platform in rear of galley No. 1 or in rear of main hospital. All other refuse will be taken to the hospital incinerator.

Smoking.—Smoking will be allowed in the wards for bed patients only. Ambulant patients, wheel-chair patients, ward officers, and hospital corpsmen will refrain from smoking in the wards. Bed patients will be allowed to smoke during smoking hours as follows: One-half hour following each meal and from 8.30 p. m. until 9 p. m. Smoking will not be allowed in the wards at any other time.

No smoking will be allowed in the halls or corridors of the main hospital. Officers attached to the hospital, and officer patients particularly, will refrain from smoking in unauthorized places. Officers attached will be allowed to smoke in the junior officers's office and staff library. No smoking allowed in the officer of the day's office. In the basement there is a smoking room, open for enlisted men and patients all afternoon.

Particular attention is invited to throwing cigarette butts around the wards and halls. A little care on the part of each person to deposit cigarette butts in spittoons and other receptacles will maintain a more cleanly appearance. Care must be taken that no cigarette is thrown into the waste baskets containing paper or other inflammables. No smoking will be allowed in the mess hall during meal hours. All persons are cautioned not to throw matches or other nonabsorbable articles into urinal and toilets. Difficulty is frequently encountered by carelessness in this regard. Matches, paper drinking cups, apple cores, etc., will not go through the pipe of urinals and toilets. All persons will be careful about expectorating on the floor of the hospital. Cuspidors are placed at convenient intervals for that purpose if expectorating is necessary.

Surgical wards.—Standing orders:

On admission: (a) Specimen of urine to laboratory.

(b) White blood cell count on intestinal, kidney, and gall-bladder cases.

(c) Start temperature chart.

(d) Liquid diet (except emergency cases, where no diet is given until seen by ward officer).

Before operation: (a) Scrub and shave and apply sterile dressing on night before operation. (Castor oil, one ounce at noon the day before operation only when specially ordered by officer.)

(b) Give enema evening before operation.

(c) No food after 6 p. m. Fluids given freely.

(d) Patient to remain in bed from noon of the day before operation.

Day of operation: (a) S. S. enema early.

(b) Have patient urinate before going to operating room. Send urine to laboratory.

(c) Morphine sulphate $1/4$; atropine $1/150$ to be given one-half hour before operation.

After operation: (a) Temperature, pulse, and respiration taken every 15 minutes for two hours.

(b) Watch for signs of shock and hemorrhage. Report unusual signs to ward officer.

(c) Fluid in small quantities by mouth after vomiting ceases.

(d) S. S. enema on second day, preceded by rectal tube if gas pains. Not to be used in rectal or Murphy drip cases except by order.

(e) Castor oil, 1 ounce on third day, except in cases like hemorrhoids, anal fistulas, etc.

(f) Liquid diets on third day, soft on fourth.

(g) Call ward officer if patient does not urinate within 12 hours.

(h) Seventh day, stitches removed and wound dressed.

ADMISSION OF PATIENTS.

All patients from main station are routed through medical headquarters; therefore no patients will be received in hospital except those ordered sent here by medical headquarters. No attention will be paid to requests from other sources. In case of emergency, medical headquarters will notify hospital where to go for patient. Confusion of records is occasioned by irregular admission of patients. A report to administrative aid will be made by the officer of the day of every patient irregularly admitted.

In compliance with a request from medical headquarters, no patient, except the gravest emergencies, will be admitted to the hospital or be taken in the ambulance without being accompanied by complete records, that is, hospital slip and health record.

No arrangement will be made for transfer or receipt of patients over telephone, except through medical headquarters.

The receiving ward will keep a ward-admission book in which will be entered the name of patient in full, rate, date of birth, nativity, religion, next of kin and address of same, time of arrival at hospital, and diagnosis. The time when seen by the officer of the day and disposition ordered will also be entered in this book. The officer of the day will initial this entry.

Immediately upon the arrival of a patient the officer of the day will be notified and will be told whether or not the case is considered serious, urgent, or contagious. All patients must be promptly seen by the officer of the day. Contagious cases and cases considered emergency may be left in the ambulance without removal to the receiving ward and will be seen by the officer of the day while in the ambulance and disposition made from there. In these cases the ward-admission book will be filled out and notation "ambulance case" made

after the patient's name. All patients actually admitted to the ward must have their pulse, temperature, and respiration taken and the officer of the day must be notified. All patients will be routed through the receiving ward.

The following routine must be observed:

Make out admission slip and send it to the general office, "change of diagnosis" desk.

When transfer is ordered by the officer of the day the transfer slip will be made out and signed by the ward nurse in charge. No transfer will be made until the patient has been actually seen by the officer of the day.

The history card, its envelope, and form "Q" chart will be opened on every patient admitted to the ward and will be transferred with the patient. No patient will be transferred without these papers.

If the patient is a prisoner, that fact will be noted in red ink on the outside of his history-card envelope.

If the case is an emergency or urgent or contagious case and is kept in the ambulance the above papers will not be made out.

A complete inventory of the personal effects of the patient will be made in triplicate; one copy filed in the receiving ward, one sent to the bag room with bag, and one sent to the ward to which the patient is transferred. The greatest care must be used in regard to listing valuables, especially watches, pins, rings, etc.; a negative note is of value in regard to these articles.

On the arrival of the patient at a new ward or unit the nurse in charge will initial transfer slip and send it to the "change of diagnosis" desk in the general office.

Patient will always be accompanied by a hospital corpsman to new ward.

If patient is a stretcher case, all the personal clothing will be removed and hospital pajamas put on, hands and face washed.

If the case is doubtful, or for any other reason a patient may be kept in the receiving ward, the same routine will be observed as is observed in any of the general wards.

A specimen of urine will be sent to laboratory in the morning and a cleansing bath will be given.

In case of transfer from one ward to another, the ward officer will first consult chief of division, who will authorize the transfer. Transfer cards to record office and routine as above. Health records and clinical cards must be complete to date of transfer.

All civilians admitted to wards as patients will have the same papers returned as if they were enlisted men. Discharge papers will be made out in the same manner when discharged. It is necessary that careful checking up of civilian patients be made in order that accurate returns may be made to Washington.

DISCHARGE OF PATIENTS.

To duty.—The discharge of a patient to duty will be effected by the ward officer sending duty slip to record office before 3 p. m. on the day before the patient goes to duty. This slip must be carefully made out, name in full (no initials) with surname first; exact place from which patient came to hospital, the original date of admission to hospital, and diagnosis under which he is being discharged. A muster list will be made in record office, copy sent to executive office and to bag room. Routine duty days, Tuesday and Friday. At 9 a. m. of the duty day the patients will be mustered in front of main hospital (in basement in inclement weather) by record office transfer man. They will then go to the bag room for their bags, after which they will be transported to medical headquarters main station accompanied by transfer man who will get receipts for his party. Distribution to units will be made by medical headquarters.

Health records and clinical cards must be completed before a patient is sent to duty. The health record must be in the record office on the morning of the duty day. No patient will be sent to duty until his papers are received by record office.

By medical survey.—A medical survey will be requested by the ward medical officer and O. K'd by the chief of division. The reports of survey are sent to the commandant for approval. In case of recommendation for discharge, when papers are returned, the record office will notify the ward and records will be closed. No case will be discharged until all papers are complete.

By desertion.—After an unauthorized absence of 10 days the patient will be declared a deserter, by request of provost marshal. The record office will notify ward, all records will be closed, and papers sent to main station.

By expiration of enlistment.—No patient will be discharged upon expiration of enlistment until well. Record office will notify wards when a patient's enlistment has expired. All records will be completed before discharge.

By death.—In case of the death of a person in the service, the officer of the day is responsible to see that the following procedure is inaugurated. Reference, Navy Regulations, Article 4551.

Record name, rate, and time of death in journal. In the daytime notify the administrative aid or commanding officer. At night the commanding officer does not need to be notified unless circumstances are unusual.

The matériel office will notify the next of kin by telegram as follows:

"Deeply regret to inform you your son ——— died at this hospital at ——— m., this date. Telegraph this hospital whether you desire body interred by Navy with military honors or sent home. If sent home, Navy will bear all expenses of preparation and transportation. Navy can not defray cost of funeral after arrival, but Bureau of War Risk Insurance, Treasury Department, Washington, D. C., may allow \$100 upon written application direct to that bureau.

"NAVAL HOSPITAL."

The commandant will be notified by letter as follows:

"Subject: Reporting death.

"1. (Name in full) (rate) (number) United States Navy, died at this hospital at (time) on (date). Diagnosis ———. Next of kin (relationship) (name) (address) and the Bureau of Navigation was notified by dispatch. Remains were shipped to (state where and when). Copy to Bureau of Navigation."

The Bureau of Navigation will be notified by telegram: (Marine Headquarters in case of marines).

"(Name) (rate) (number). United States Navy, enlisted at (place) (date), died at this hospital at (time) (date) diagnosis ———. Next of kin (relationship) (name) (address) notified.

"NAVAL HOSPITAL."

In the wards.—The nurse will be responsible for the proper preparation and cleanliness of the body. A tag will be fastened to the big toe giving full name, rate, hour of death, ward to which attached, name and address of next of kin, if possible, as given by the patient before death. The remains will be carried to morgue by ward personnel.

No autopsy will be made without the specific permission of the commanding officer. In all cases of deaths on which autopsies have been performed, a short résumé of the autopsy report will be included in the health record and also on Form N (death report). The ward officer is responsible for writing up this record and will get these notes from the laboratory.

The chief master-at-arms will be in charge of morgue. Upon death of a person in the hospital the officer of the day will notify the chief master-at-arms, who

will take charge of body at the morgue and will notify the undertaker having current contract to prepare remains for burial or shipment as the case may be.

Upon notification from the undertaker that the body is embalmed, the officer detailed for this duty (or in his absence the officer of the day) will inspect the body in the nude. If inspection is passed, the body will then be dressed and placed in the casket by the undertaker, when it will again be inspected. The casket will then be sealed in the presence of the inspecting officer. A notation will be made in the journal covering the following points:

"That the work of embalming, cleansing, shaving, and dressing have been competently performed; all the casement, clothing, etc., met with all the requirements of the contract." (See Navy Regulation 4551, par. 5.)

Ward officer will prepare a Form N and complete the health record and turn in to record office.

Matériel officer will prepare a death certificate and the necessary forms for the department of public health for the State of Illinois.

Immediately upon the death of a patient the officer of the day will cause to be collected money, valuables, clothing, and personal effects. Inventory of the effects of the deceased will be made by nurse in the wards. These effects will be sent to the bag room if clothing, if personal effects to the administrative aid. The bag-room man will lay out and make a rough inventory of effects; notify the officer of the day when ready. Officer of the day will initial the rough inventory and will later sign the smooth copy. A note will be made in journal at time inventory is made. Clothing will then be sent to supply officer, naval training station, to be forwarded to the next of kin. These effects will be accompanied by letter, inclosing a copy of the inventory.

LETTER TO SUPPLY OFFICER.

"Subject: Forwarding effects (clothing) for shipment to next of kin of deceased persons.

"Inclosures: (2) Inventories.

"1. Inclosed are inventories in duplicate of the effects of the following-named persons, deceased.

(Name)	(Rate)	(Name)	(Rate)

"2. These effects are being delivered by our truck to building No. 16. Each bag or package is tagged with deceased's name.

"3. It is requested that these effects be shipped to the address given in inventory.

"4. Please acknowledge receipt on duplicate copy of this letter."

Personal effects will be sent by the administrative aid through the matériel officer direct to the next of kin by registered mail, accompanied by circular letter No. 134677-1. "Information for next of kin."

In case of shipment of remains to next of kin, proceed as follows: Inform undertaker who places remains in shipping casket. Master-at-arms will mark shipping box promptly with correct address to which shipped.

Matériel office will make out a request for shipment by express or baggage on supply office, who returns copy of bill of lading to hospital. The next of kin will be notified by telegram as follows:

"Body of (name) leaving Chicago, via ——— car number ——— train number ——— at (time). Will arrive at (station) about (hour) (date).

"NAVAL HOSPITAL."

In case next of kin can not be located, matériel office will notify Bureau of Medicine and Surgery by telegram.

In case of local burial, matériel office makes arrangements with main station for funeral service, escort, chaplain, and firing squad. A flag will be draped on every casket. This flag will be labeled and kept in the storeroom pending request from next of kin for its shipment to them.

The officer of the day will be a member of the funeral party in charge of the enlisted personnel from hospital.

Graves will be dug under direction of the matériel officer.

The officer of the day will note fact of funeral in journal.

In case of death of supernumerary.—Supernumerary patients who die at the hospital are not entitled to burial at Government expense without special permission from the Bureau of Medicine and Surgery. Telegram sent as follows:

BUREAU OF MEDICINE AND SURGERY,

Navy Department, Washington, D. C.:

Permission is requested to ship remains of (name), (rate and status), a supernumerary at this hospital to (place) at request of next of kin.

NAVAL HOSPITAL.

If there is no next of kin or if next of kin does not desire remains shipped to him, interment will be made at Government expense at Government cemetery the same as for men in the service.

Effects are inventoried and forwarded the same as for men in the service.

When the death of an enrolled member of the Naval Reserve Force attached to the district is reported to the bureau, by telegraph or otherwise, it must be stated in each report whether or not the man was on active duty at the time of his death.

NURSE CORPS.

Chief nurse will instruct assistants and supervisors in their work, cooperate with and advise them in their duties, and is responsible that they perform their duties.

She will make out detail of nurses and submit same to administrative aid. All records concerning nurses are filed in office of the chief nurse. Each nurse's papers are in a jacket and card indexed. All letters concerning nurses and all orders concerning quarters and wards are filed.

Reports of hospital corpsmen.—These reports are sent to the office of the chief nurse every Sunday morning. The assistant chief nurse and supervisor enter these reports upon the men's cards and call an adverse report to the attention of the chief nurse, which report is then made to the ward officer. If the man's work does not improve in a reasonable length of time the report is then made to the administrative aid.

Inspection is made twice daily by the assistant chief nurse and the afternoon supervisor who reports condition of patients and ward to the chief nurse. The chief nurse makes inspection in the main hospital daily between 10 a. m. and 11.30 a. m., in group I on Tuesdays, group II on Wednesdays, group III on Thursdays, and accompanies the commanding officer or administrative aid in the general inspection throughout the entire hospital on Saturdays.

Ward nurses.—Carry out instructions according to Manual for Medical Department as to care of patients, ward discipline, and teaching.

Morning nurse reports at 7.55 a. m., relieving night nurse at 8 a. m., is relieved at 3 p. m. by afternoon nurse, who reports 5 or 10 minutes before the hour. Inspects the ward with relieving nurse.

Night nurse reports at 9.45 p. m. so that nurses may give her their reports and be off wards at 10. All nurses are required to report on and off promptly and can not remain in the wards after their duty hour without special permis-

sion from the chief nurse. According to the manual, the ward nurse has full authority as such and is responsible for upkeep, cleanliness, and order; detailing and instructing of hospital corpsman under her.

Night nurse is assigned to groups and makes hourly rounds writing the report of each ward on form provided for the purpose. She inspects all wards thoroughly upon coming on duty and before turning her duties over to the day force. All nurses are responsible for the condition in which they turn over their wards. Blankets are counted by each shift of nurses and recorded in day order book.

The report of the night nurse is on the back of the afternoon nurse's 10 p. m. report and is sent to the office of the chief nurse in the morning. A morning report is sent to the chief nurse's office of: Number patients, beds, empty beds, and bed patients.

Nurses' quarters.—Inventories are made and quarters kept up by housekeeper. Nurses clean their own rooms. Maids or men clean halls, bathrooms, living rooms, galley, and porches. An inspection of the nurses' rooms is made frequently by the assistant chief nurse and weekly by the chief nurse.

Every Saturday at 12.30 p. m. the morning nurse is relieved by the evening nurse and does not report for duty again until Sunday at 12.30 p. m.; the evening nurse is relieved and given 24 hours off. Supervisors relieve each other every other Sunday for the day as does the chief nurse and assistant chief nurse.

Symposiums are held every Monday evening at 6 p. m. Every nurse is required to attend and is mustered, is excused only when needed where there is a very ill patient.

The chief nurse assigns one nurse to instruct the hospital corpsmen in nursing, practical and theoretical, one day each week as part of school course. A written report is handed in at the end of the course and recorded on the efficiency card in red ink. Nurses in wards instruct daily in practical nursing.

Linen.—Chief nurse is responsible for all linen in use in the hospital. On the last day of every month the nurse in charge of the ward brings her report to the office of the chief nurse. Excess linen is turned into the linen room. The nurse in charge of a ward is supposed to check up linen daily. A report from every department of the hospital on linen is sent in on the last day of the month. The linen room has a register where all linen or any article given into the linen room is registered and all accountability slips are filed according to ward so that reference may be made easily.

The linen room is in charge of head seamstress. Soiled linen is counted and checked by nurse in charge of ward and placed in her book. Two slips are made in ink to go with the linen to the laundry.

Head laundryman counts linen with hospital corpsman and O. K.'s both slips, retaining one and giving hospital corpsman one, which he takes to the linen room and receives the same amount of clean linen.

All bed linen showing the least hole is returned to the linen room and exchanged for a good article.

The seamstress keeps accountability slips from wards, also an account of linen and articles issued to linen room.

All linen for survey is carefully preserved in bags for survey board.

A monthly report is made to the chief nurse.

HOSPITAL CORPS.

All hospital corpsmen will muster in the main hospital at 6.30 a. m. sharp. The night hospital corpsman will call the hospital corpsmen at 6.15 a. m., and but one call will be given. Night men and men detailed in contagious units only will

be exempt from 6.30 muster and drill. All men on liberty will be careful to see that they are checked both in and out by the officer of the day. Those not actually on liberty will be present for muster and drill. Any hospital corpsmen violating these regulations will be reported to the administrative aid.

In inclement weather drill will take place in one of the empty wings of the Hospital Corps barracks; otherwise on the roads and open spaces in the hospital grounds.

Ward hospital corpsmen will report to wards at 7 a. m. on their short day of duty and at 8 a. m. on their long day.

Hospital corpsmen detailed for duty in contagious units will sleep in unit and will not frequent barracks. During period of this duty they will be quarantined; no liberty will be granted.

The 48-hour liberty granted to star wards will be taken only at week ends. Not more than one hospital corpsman is to take liberty at any week end. If quarantined this liberty will be granted at expiration of period of quarantine.

The hospital corpsmen on day duty in ward or offices will follow the daily routine and will be directly under orders of ward officer and ward nurse.

All hospital corpsmen shall regard their details as posts of duty from which they shall never be absent except by permission of proper authority. Hospital corpsmen in wards will relieve each other for meals. It is considered that 30 minutes is ample time for meals. If meals are late or hospital corpsmen are unavoidably detained for any cause they are to inform the officer of the day, who will inform the commissary to prepare late meals.

Hospital Corps barracks will be under charge of hospital corpsman, who will act as master at arms and will be responsible for general cleanliness and order. He will maintain discipline and report infractions of rules.

He will be responsible for cleanliness of living rooms, toilets, and locker rooms, and will have supervision of cleanliness of barracks. Barrack rooms will be cleaned by occupants. Each man will be responsible for his own bed, and the window near it. Each bunk will be tagged with occupant's name. No baggage or personal effects will be kept in barrack rooms. Weekly routine will be followed. The petty officers will be divided equally between the different barracks.

The second-class petty officers not on liberty will be responsible for discipline and carrying out of orders in their particular wing. The wing includes barracks, toilet, and locker rooms. Third-class petty officers will assist.

The night Hospital Corps detail will report for duty at 9 p. m., at which time they will take over the duties of the day Hospital Corps detail. Under the supervision of the night nurse they will carry out the routine and ward orders in the night order book.

The night hospital corpsmen will not leave their station and duty for any cause without being properly relieved. If necessary for one to be absent from his duty he will first notify the supervising night nurse, or in her absence the officer of the day, who will make the proper relief. Failure to obey this instruction makes him liable for court-martial for absence from station and duty.

Night hospital corpsmen must not sleep during the period of duty but must be ever alert.

Routine for night hospital corpsman.—9 p. m.: Receive order book from the day hospital corpsmen and inspect same. Makes rounds of wards to see that all is secure, all lights out, except standing lights, and all patients quiet and in bed.

10 p. m.: Stands by for the officer of the day's inspection and accompanies the officer of the day through wards. Assists the night nurse in checking up

patients in wards. An hourly check of patients is made by the supervising nurse for this report. The night hospital corpsman will assist the nurse on these hourly checkings.

Four-hour temperatures are taken at 12 midnight and at 4 a. m. Other treatments will be carried out as ordered by the ward officer.

All specimens for laboratory must be very carefully collected and taken by the night hospital corpsman to laboratory before going off duty in the morning. The specimen collecting is important and should be given very careful attention.

7 a. m.: Relieved by the day hospital corpsman. Makes verbal report to day hospital corpsman on condition of patients and absentees.

Whenever a hospital corpsman is sick and needs to go on sick list the officer in the ward to which he is attached, or the officer in charge of the department, will request from the administrative aid permission to place him on sick list, except at night when the man may be temporarily relieved by the officer of the day and be taken up the next morning as per above routine.

The officer in charge of the department or ward will then have notice sent from his ward to the officer of the day that the hospital corpsman is to be admitted. The officer of the day will assign a ward. The ward to which the patient is assigned will send the regular admission slip to the record office.

No relief will be assigned for a hospital corpsman until the above routine is carried out.

Members of the Hospital Corps will be assigned to and relieved of their regular station or duty only by order of administrative aid.

Whenever hospital corpsmen request advancement in rating the request will take the following form:

From:

To: Commanding officer

Subject: Change of rating.

1. I request that I be examined for advancement in rating from _____ to _____.
2. My enlistment expires _____. I enlisted on _____ and had the following ratings during my service in the Hospital Corps.
H. A. 2 from _____ to _____.
H. A. 1 from _____ to _____, etc.
3. Since being last examined I have (not) had any offenses on my record.
(Signed) _____

(1st indorsement.)

(Date.)

From: (Ward officer under whom man is at present serving).

1. (A recommendation from the ward officer as to the character and ability of the applicant for examination. The ward officer will state in this recommendation that he has examined the applicant's enlistment record and his report cards of fitness carried in the office of the chief nurse and in the executive office).

(Signed) _____

(2d indorsement.)

(Date.)

From: Record office.

1. The records of the above-mentioned man are clear.

(Signed) -----

(3d indorsement.)

(Date.)

From: Commanding officer.

To: Examining board.

1. You will examine the above-mentioned man for -----.

(Signed) -----

SCHOOL FOR HOSPITAL CORPS.

School for hospital corpsmen of the grades of H. A. 1 and H. A. 2. Hospital corpsmen will report in the following order to the main dining room: Promptly at 2 p. m., the hospital corpsmen not on the liberty list for that day; hospital corpsmen who are on the liberty list for that day will report at 3 p. m. No school will be held Wednesdays, Saturdays, and Sundays. A muster book will be kept by master-at-arms showing attendance on each lecture.

The course will consist of eight lectures on each of the following subjects and will be completed in two months. The course will follow the outline suggested in the Handy Book for hospital corpsmen.

Monday, 2 p. m.: Instructor, a medical officer.—Anatomy and physiology: The skeleton, joints, muscles, digestive apparatus, blood and circulatory system, respiratory and excretory apparatus, and other organs of the body.

Monday, 3 p. m.: Instructor, a medical officer.—Minor surgery and first-aid, (including surgical and operating room technique); emergencies of all kinds, contusions, wounds, hemorrhages, sprains, dislocations, fractures, patient and operator, the proper conduction of minor surgical procedures within the duties of hospital corpsmen, attendance upon larger operations in the operating room with the surgeon, methods of sterilization, removal of foreign bodies in eyes, ear and air passages, treatment of effects of excessive heat and cold, bites of poisonous animals, insensibility, fits, asphyxia or suffocation, bandaging, application of splints and knowledge of Hospital Corps Drill Book.

Tuesday, 2 p. m.: Instructor, a nurse.—Nursing practical and theoretical, including ward management, beds and bed making, baths, treatment other than by mouth, external applications, temperature, pulse, respiration, symptoms and clinical surgical nursing including preparation of patient for operation.

Tuesday, 3 p. m.: Instructor, a medical officer.—Hygiene and sanitation—water, air, ventilation, heating and lighting wards, etc., disposal of waste; disinfection and disinfectants, sterilization, handling of infectious disease and prevention of disease; practical duty in the field.

Thursday, 2 p. m.: Instructor, a dietitian.—Diets and messing for the sick; classes of food, various classes of diets, diet for special diseases, obtaining and preparation of food, proper service of diets to patients.

Thursday, 3 p. m.: Instructor, a pharmacist.—Clerical procedures and forms; knowledge and preparation of bureau forms, typewriting and ability to formulate tables and charts.

Friday, 2 p. m.: Instructor, a pharmacist.—Pharmacy and chemistry; materia medica; various pharmaceutical processes employed in the manufacture of official preparations, relative proportions of the more important drugs entering into their composition, weights and measures, specific gravity, etc. Incompatibilities;

chemical symbols, the formulas of the more important chemicals with tests for identity and the reaction produced by their combination.

MASTER-AT-ARMS.

The day master-at-arms will be the chief petty officer concerned with maintenance of discipline. (See Navy Regulations.) He will keep a request book in which will be entered a synopsis of the request. All requests must be O. K.'d by ward officer before being entered in book. Requests of all nature, including deposit or withdrawal of money in safe, will be entered in book. Book will be open for receipt of request at master-at-arms desk from 9.15 to 10 a. m. daily, except Saturdays and Sundays, at which time it will be submitted to administrative aid.

He will keep a report book for offenses, in which will be entered the name of offender, his ward, his rate, nature of offense, reporting person, punishment awarded, and initial of commanding officer.

Mast will be held daily except Saturdays and Sundays at 10 a. m. All men on report and necessary witnesses will stand by at executive office at that time.

He will be custodian of all confined prisoners and will arrange watch on brigs under direction of administrative aid. (See Prisoners.) He will keep a book showing names of prisoners, sentences imposed and date of expiration of same. He will bring expiration of sentences to notice of administrative aid. When prisoner is confined, a notation of confinement will be made in the journal.

He will have charge of all manacles and other restraint apparatus.

He will be responsible for care and cleanliness of brigs and equipment.

He will be responsible for cleanliness and have supervision over cleaners and other details in main hospital corridors, offices, elevator, etc.

Either a chief petty officer or assistant master-at-arms will be present at all performances in Red Cross building and will see that order is maintained. He will use patients detailed to Red Cross building as his assistants on these occasions.

The chief master-at-arms (C. Ph. M.) will supervise and witness all issue of clothing and small stores to men belonging to hospital and will see that forms are correctly made out. Clothing and small stores party will leave hospital on Wednesdays at 2 p. m. Slips must be in master-at-arms office before 10 a. m.

He, or his assistant, will muster liberty parties and report liberty party ready to officer of the day. For purposes of discipline he will be in charge of Hospital Corps and will report all infractions of rules to administrative aid. He will muster Hospital Corps at school hours and report absentees.

The night master-at-arms will report for duty at 9 p. m., at which time he receives from the officer of the day such special instructions as may be necessary.

He will not leave his station or duty for any cause without being properly relieved. If necessary to be absent during his period of duty, he will first notify the officer of the day who will provide the temporary relief. Failure to obey this instruction makes him liable for court martial for absence from station and duty.

The night master-at-arms must not sleep during his period of duty, but must be ever alert.

His routine duty will consist of seeing that all night hospital corpsmen are on their station and on duty, that the hospital and galley are secure, and that in the case of illness of any hospital corpsmen a relief is furnished. He will stand by in the officer of the day's office to answer emergency calls as indicated by the

officer of the day. He will check up brig prisoners and see that the brig is secure. In absence of the night officer of the day he will answer the hospital telephone. In case of fire during the night, the night master-at-arms will stay at the officer of the day's office and carry out such other orders as may be designated by the officer of the day.

At 6.15 a. m. he will call all hospital corpsmen. The call bell will be rung through the entire length of each occupied wing of the hospital corpsmen's barracks. At 7 a. m. he is relieved from duty by the day master-at-arms after making report to officer of the day.

PRISONERS.

Whenever a prisoner patient is received at this hospital a note will be made in the officer of the day's journal noting the receipt and what kind of prisoner he is, as G. C. M., S. C. M., D. C., A. S., etc

As a general rule all prisoners will be confined in the brig for safe keeping, unless their physical condition is such that they need to be sent to wards, in which case the ward will be notified in writing that the patient is a prisoner and is to be restricted

The responsibility for notifying the ward is entirely that of the officer of the day, and he will make it his business to see that the ward absolutely knows that the patient is a prisoner.

When a prisoner is admitted to receiving ward the nurse in charge of unit will make a note on the envelope jacket of his history card in red ink, as follows: "G. C. M. (or, etc.) prisoner."

No patient prisoner will be allowed to leave a ward. The prisoners' beds will be so marked that all nurses and hospital corpsmen will be cognizant of the fact that the patient is a prisoner. The responsibility for the care of the prisoner is a grave one, and should be assumed by the nurse and hospital corpsmen in each of the wards, and all attendants should see that the prisoners are safely confined or restricted to the wards at all times.

The ward officer will make a note in writing in the order book of such orders as he wishes carried out in regard to the care and safeguarding of prisoners. This must be done in the case of every prisoner and signed by the ward officer. Nurses and other attendants will follow orders issued by ward officers. These orders should be explicit and should be written with an idea of restraining the prisoner and not with the idea of granting him privileges. As a general practice all clothing of prisoners should be taken away and turned over to the bag room while prisoner is in ward. Prisoners should not be kept as patients longer than is needed to cure their urgent ailments. No unnecessary or non-emergency operations or procedures should be undertaken on prisoners.

The discharge of all prisoner patients will be expedited by the ward officer as soon as they are able to leave the hospital.

A list of prisoners at large and prisoners in the brig will be kept in the officer of the day's office and be checked up frequently by the officer of the day to assure himself that all prisoners are on the list. The list will be furnished to the officer of the day daily by the record office. If the officer of the day finds any discrepancy in the list he will immediately notify the record office of that fact. The officer of the day will particularly note the presence of prisoners in wards and assure himself that all prisoners in the brig are safely confined. No prisoner will leave his place of restriction or confinement without a guard.

The following entry shall be made in the journal regarding prisoners at 10 a. m.:

"Confined prisoners visited at (time). List of all prisoners checked, all accounted for:—(Number) G.C.M. prisoners; (number) S. C. M. prisoners; (number) D.C. prisoners; (number) others (number) in brig."

When a general court-martial prisoner is admitted to the hospital he will be confined in the brig or in the psychiatric unit for safe keeping unless his physical condition is such that the chances of escape are negligible or unless he is a contagious case. When confined in brig or psychiatric unit he must be kept in locked room unless allowed out with guard by proper authority. When policed he should be in charge of hospital corpsmen. He must never be allowed unguarded freedom.

The officer of the day must take every precaution to safeguard the interests of the hospital in the detention of prisoners.

All prisoners in the psychiatric unit shall be placed in cells, and the door to the cell shall be kept locked at all times. Cells shall be tagged with the information that the occupant is a prisoner, his status, and that he is to leave the ward only on an order from the proper authority and under guard. If it is necessary for any prisoner to leave his cell, he shall be accompanied by a guard, who shall be responsible for his safe keeping. When the hospital corpsman on watch is relieved he shall turn over to his relief all orders regarding prisoners confined and the precautions for their safe keeping.

The main entrance to the ward shall be kept locked at all times and the keys kept on the person of the nurse or hospital corpsman on watch. The opening to the diet kitchen shall be kept closed at all times, except for the actual serving of meals, at which times the hospital corpsman shall stand by to see that no persons use it for an exit.

Brig watch will be detailed for a specific period of time. He must not leave brig unless instructed to do so by proper authority, i. e., commanding officer, executive officer, officer of the day, or master-at-arms. When the brig watch is on duty for 24 hours he will sleep in brig. He will be allowed to leave the brig for meals but must not delay either to or from meals and must hurry straight back to his post of duty. At expiration of watch he will be properly relieved by his relief at the brig and turn over prisoners and keys to the relief. Relief will assure himself that all prisoners are present and securely confined.

When prisoners are worked about hospital grounds the brig guard will act as guard of working party and will take every precaution to keep the prisoners together and prevent them from escaping. No general court-martial prisoners will be worked in working party. They must be kept securely confined in brig, in which case the working party will be turned over to the relief watch and the regular watch will stand over the general court-martial prisoners in brig. General court-martial prisoners will not be taken to mess for meals, but meals will be taken to brig. Other prisoners will be marched under guard to the mess hall for meals. They will be immediately returned to brig without loitering. The guard must keep the prisoners within sight at all times. They must not be allowed to enter any building alone.

Prisoners must have no privileges; they must not be allowed to smoke in cells nor to have reading matter. All that will be allowed in cells are bed, bedding, and chair, toilet gear, and an extra change of clothing will be allowed each prisoner.

These orders must be strictly adhered to; no deviations will be allowed. Watches are strictly accountable for carrying out these orders. Keep the officer of the day informed of any violations of rules by prisoners. If necessary to be relieved at any unusual time call the officer of the day for permission. Prisoners must not be allowed out of the brig at any time except by permission of competent authority.

GALLEYS.

No food, such as sugar, butter, eggs, etc., other than issued for regular meals will be issued to the different units or wards from galleys unless such issue is approved by the commissary officer.

All issues of food ordered for a ward or unit will be authorized by the medical officer and drawn from the commissary between 9.30 a. m. and 10.30 a. m.

All storerooms and ice boxes will be furnished with Yale locks. Keys will be in the possession of the chef, or cook, in charge, who will be directly responsible for the issuing and security of such stores from the galley.

The galley is in charge of the chef, or in the absence of the chef, the cook next in rating will assume charge, and all orders pertaining to galley routine will be considered as authoritative.

The night cook will be in charge of galley from the time the day forces leave at 6 p. m. until 5 a. m. the next day. The force of night cook and messmen, after meal hours at 12.30 a. m., will clean all mess gear and cooking utensils; clean tables used; and clean fires and remove all ashes.

The galley force will be responsible for the cleanliness of the galley and storeroom.

Patients will not be admitted to mess halls before meal hours nor be allowed to loiter after meal hours.

All men not detailed for work in the galley will not be allowed entrance at any time. Civilians will not be allowed in any galley, except for legitimate work, without authority from administrative aid.

No hospital corpsman, civilian employee, or patient will use any galley or serving rooms in any galley as an eating place. No special meals will be given out of the galley for service rendered.

Mess cooks and messengers eat at early mess.

Schedule for galley No. 1.—Monday: Wash tables and benches after each meal; swab deck and clean sink; scrub stairs and lower hallway.

Tuesday: Same as Monday.

Wednesday: Same as Monday, and wash windows and sills.

Thursday: Same as Monday, and wash walls and shine lamps.

Friday: Same as Monday, and wipe radiators; clean gear room.

Saturday: General cleaning; shine silverware and brass doors.

One cook will report at 5 a. m. and prepare the fires in the galley ranges and make other preparations for the regular day forces coming to work; the cook who starts work early will leave work at 2.30 p. m. that day.

The meal hours for galley No. 1 will be as follows:

Breakfast, 7.30 to 8 a. m.

Dinner, 12 noon to 12.30 p. m.

Supper, 5 p. m. to 5.30 p. m.

Night watch, nurses, civilians, and hospital corpsmen, 11.30 p. m. to 12.30 a. m.

At all other times the galley and storeroom will be kept locked.

The main galley will supply all soft and special diets to all wards, to officer and nurse patients, to officers' mess, and to chief petty officers' mess.

All patients' messes will be served:

Breakfast, 7.30 a. m.

Dinner, 11.30 noon.

Supper, 4 p. m.

Officers' mess and chief petty officers' mess will be served at 8 a. m., 12 noon, and 5 p. m.

Table linen in officers' and chief petty officers' mess halls will be changed twice a week.

Table napkins will be changed three times a week.

All outside doors leading to the main galley will be closed and locked after supper every evening. The master-at-arms will carry the keys. The officer of the day will inspect these doors to see if they are locked.

This includes the doors from basement outside east and west doors, inside basement door, and doors to officers' mess rooms from main hall and doors from main dining room.

Contract provides that: "It is understood that in all cases the garbage will be deposited in metal containers of a convenient size, and that the party of the second part will use proper care to keep refuse properly segregated, viz, bones, food refuse, and mess rubbish in separate containers, but this contract is on the express condition that no damages will secure to the said party of the second part by reason of its failure to keep the refuse so separated."

In order to comply with the above, no dry refuse, cinders, or other materials except kitchen garbage will be kept or stowed on the platform, rear of galley No. 2. Bones will be thrown into a can separate from other refuse. Food refuse will be kept separated. No tin cans will be mixed with food refuse. Food refuse from wards must not be mixed with papers, cans, ward débris, or other refuse. All food refuse is sold by contract for the use of animals or fowls and consequently must be kept clean.

The master at arms in galleys under commissary officer will detail a person who will be responsible for seeing that the garbage house, containers, and garbage are kept clean.

BAG-ROOM ROUTINE.

The record office will send daily to the bag room a list of patients admitted to the hospital for the preceding day showing the units from which they came.

A truck accompanied by one bag-room man will collect the baggage from the main station dispensaries daily (or as necessary). At each dispensary the bag-room man will compare each bag seal number and tag bearing the patient's name with the original on the inventory and if correct will receipt for same on dispensary books.

No bag will be accepted unless properly sealed. Under no circumstances will unsealed property be receipted for. When signing dispensary books and inventory use this form:

"Received seal bag No. ——. Contents unknown" (name) (rate). If bag is accompanied by hammock, mattress, and blankets, add "hammock complete" or "hammock incomplete," as the case may be. If none of these, add "No Government property." This must be accurately and conscientiously done in order to avoid claims for loss of property. Be sure the bag signed for is the one received.

Upon arrival at hospital bag room the names and seal numbers are again verified. Cards bearing the name, seal number, and bin number in which stowed are then made out and filed alphabetically as are the original inventories.

A report will be made to medical headquarters, main station daily (or whenever baggage is received), acknowledging receipt of baggage. This report will show name of patient, seal number, condition of baggage, such as "Sealed bag O. K.," "Improperly sealed bag," or "No blankets," as the case may be, but in case of improperly sealed bag or broken seal, inventories will be made out immediately by bag-room man in presence of witness and any discrepancies noted. This inventory will be signed by both bag-room man and witness. These discrepancies will be included in this report to Medical Headquarters. A carbon copy of this report will be filed in the bag room for future reference. When

making inventories of clothing or filing cards and inventories accuracy is essential. Any mistakes made here are the main source of future cause for complaint.

Drawing clothing.—The following routine will be observed: Patients shall draw clothing from bag room but once. Nurses and hospital corpsmen will see that patients draw all articles necessary the first time they come to draw.

Chapter 8, section 19, article 1511, Manual for Medical Department, United States Navy, is quoted at the bottom of requisition slips. No patient will be permitted to have more clothing in ward than is included in this list. Suit cases and handbags will not be kept in wards.

When a patient goes on leave he may draw his suit case by presenting slip marked "leave" to the bag room, and shall take suit case back to bag room on return from leave. Before going on leave he will take all clothing and effects from ward to bag room. Anything that he happens to leave in ward will be properly tagged and inventoried and sent to bag room, where receipt will be given.

Clothing will be issued between the hours of 1.30 and 4 p. m. daily except Wednesday, Saturday, and Sunday.

Under no circumstances will one patient be permitted to draw another patient's clothing. In case patient is not able to go to bag room and clothing is necessary, ward hospital corpsman on signed order from ward officer, and if possible signed by patient also, will draw clothing for patient. If man's bag is sealed, the seal will be broken and complete inventory made of bag by bag-room man in presence of this hospital corpsman, both of whom will sign inventory. The clothing issue slip will also be signed by both men.

Discharge of baggage.—A list of patients for duty will be sent to bag room by personnel office. This list will be posted on window on south side of building. The man's card is taken from files and bin number ascertained. Baggage will be delivered to patient at south door. If seal is unbroken patient will receipt on card "Sealed bag received O. K." If seal has been broken the patient himself will inventory his bag in the presence of the bag-room man. If satisfied he will receipt "Seal broken, baggage O. K." If not satisfied and bag-room personnel can not make adjustment case will be referred to the administrative aid.

Men going to duty will be cautioned that they are also signing for hammock outfit complete, which outfit should accompany the bag. They will receipt for "Hammock outfit complete" or as the case may be.

This same procedure is followed when a man is discharged on medical survey, except that all Government property is retained at the bag room. Cards and inventories will be filed for future reference.

In case of desertion the bag room will be immediately notified by personnel office, a copy of the report to provost marshal being sent to bag room. All baggage will be inventoried in duplicate, a copy retained at bag room, original sent to personnel office. Effects will be turned over to provost marshal, main station, when ordered by personnel officer.

Personal property of patients received in wards shall be carefully inventoried and copy of this inventory sent immediately to the bag room.

In making this inventory there will also be noted such articles as blankets, mattresses, mattress covers, or other Government property. If blankets are received with the patient they should not be taken up in the ward, but should be immediately labeled with the man's name and transferred to the bag room, where a receipt for same will be given.

As the hospital is responsible for every blanket received and must return blankets to the place from which patient comes, it is essential that these blankets be sent to the bag room with inventory of the patient's effects.

In case of death get effects and inventory from unit in which patient died. Make rough inventory of effects in bag room. Have officer of the day verify inventory and sign same. Make three copies of inventory. When ordered by personnel officer, take inventories and effects, minus blankets, mattresses, and other Government property, to supply officer in building No. 16, main station, who receipts inventories. Two copies are returned to hospital—one for record office and the other for bag-room files.

GARAGE.

The chief garage mechanic will be in charge of all garage activities under an officer designated by the commanding officer. He will be responsible for the care of all vehicles, tools, and Government property. The commanding officer will look to the chief garage mechanic to see that all instructions issued to the garage are being carried out. He will have personal charge of all oils, greases, gasoline, tires, tubes, and garage tools, and will have one of the drivers designated as his assistant. Either the chief garage mechanic or his assistant will be on duty at all times during working hours. The chief mechanic or his assistant will, as a rule, answer all phone calls and will see that the orders are properly carried out.

Ambulance drivers and truck drivers will be on duty from 8 a. m. to 4.30 p. m. daily except Saturday afternoon and Sundays, when one-half of the drivers will be excused. One ambulance driver will be on duty after working hours and nights in rotation to answer all emergency calls.

The drivers will be responsible for the condition of all ambulances and will report all accidents and any breakage to the chief garage mechanic, who will transmit the report of accidents to the officer of the day for entry in the journal. All cars will be kept clean at all times. Ambulances will be available for duty at all hours, cars always supplied with gasoline, especially at week ends.

Ambulance will make regular trips to main station daily except Saturday afternoon and Sunday at 10 a. m. and 2 p. m., at which hours they will bring to hospital all ordinary cases. Contagious and emergency cases will be sent for at any hour. The officer of the day will be guided by nature of calls and will report to administrative aid calls made as emergency calls which turn out to be for ordinary cases.

When making a trip for patients the ambulance will be equipped with stretcher and sufficient blankets. Except in gravest emergency no blankets will be accepted from main station for use on ambulances or for transportation to hospital.

When returning with patient, all ambulances will go to receiving ward, except in cases of gravest emergency, when name and disposition of patient will be taken by ambulance driver to the receiving ward for entry in their ward book.

The guard mail trip will be made daily except Sundays; the driver will act as messenger and will report to the officer of the day at 11 a. m. and 3 p. m. The officer of the day's messenger will bring mail from general office to officer of the day at above hours. No guard mail trip will be made on Wednesday and Saturday afternoon.

Ambulance will be sent to the electric station daily to meet the north-bound train arriving at 8.40 a. m. If passengers, it will return immediately to hospital and then meet the 8.57 train. If no passengers on 8.40 it will wait for 8.57. An ambulance will connect with the 4.15 p. m. south-bound electric daily except Sundays. Ambulance will not meet other trains except on order from officer of the day.

Fire truck will be ready at all times to answer calls. The fire truck will make a trip daily at 8 a. m. around the central plaza to insure its being ready for duty. No unauthorized persons will be allowed to ride on fire truck at any time.

Trucks will be kept in condition by drivers. They will be available for such duty as may be designated by officer in charge. Commissary supplies, laundry, cinders, and patients' baggage will be hauled daily on routine. The chief petty officer in charge of bag room will make request to garage for truck to collect bags from main station. All garage doors are to be kept closed after working hours.

The Red Cross nurses' car will be available at all times for members of the Nurse Corps. No other persons are authorized to use this car. When not in use the car will be kept locked and driver designated for car will personally carry the key.

The utility car "Grey Ford" will be available for use of commanding officer at all times. Used only on order of commanding officer.

All used tires and tubes beyond repair will not be kept in stock in garage but will be turned into the storeroom for survey.

The garage will be the repository for group 3 polisher, each member of the group will return the polisher to garage after being used.

Group 3 includes wards 29, 31, 33, 34, 35, psychiatric and Hospital Corps barracks.

LAUNDRY.

The laundry is under the supervision of civilian chief laundryman who details civilian personnel and is responsible for maintenance, upkeep, and security of laundry, equipment, and stores. He confers with material office about purchase of supplies.

Working hours.—8 a. m. to 12 noon; 12.30 p. m. to 4.30 daily, except Saturdays, to 12.15 p. m. until work is completed. The laundry is open daily except Sundays from 8 a. m. to 5 p. m. Saturday afternoon open until work is finished.

Flat work from wards and barracks received daily except Sundays from 8 a. m. to 9 a. m., delivered daily to linen room 8 a. m. and 1 p. m.

Hospital corpsmen and patients' personal laundry (allowed two washings per week, either Monday and Thursday or Tuesday and Friday) must be in laundry by 9 a. m., delivered same day as received before 5 p. m. Patients' personal laundry lists will be made out by ward nurse same as flat work. All contagious laundry, all laundry from skin diseases and all patients' personal laundry will be sterilized in autoclaves before laundering.

Officers' laundry received Monday morning, delivered Thursday.

Nurses' flat work: (a) New quarters, received Monday morning, delivered Tuesday 1 p. m. (b) Old quarters, received Tuesday morning delivered Wednesday 1 p. m.

Nurses' uniforms: (a) New quarters, received Monday morning, delivered Tuesday and Wednesday as finished. (b) Old quarters, received Tuesday morning, delivered Friday and Saturday as finished.

Nurses' personal laundry received Monday morning and delivered Saturday morning.

Staff chief petty officer laundry including four shirts received Mondays before 9 a. m. and delivered Thursday before 5 p. m.

All laundry received from wards or barracks must be accompanied by list in duplicate; one returned as receipt to sending unit, the other kept on file in laundry. All laundry must be checked in and out and record kept on file in laundry.

TELEPHONE.

The hospital telephone is an official telephone. Only certain persons and offices are allowed to use the telephone for personal business. All other usage must be strictly official.

All official messages requiring transmission or answer will be received in the officer of the day's office and entered in a telephone book kept for that purpose. Entries will be initialed by recipient.

The phones are classified according to the character of their calls by various devices on the opals on the switchboard:

Plain opal, interhospital calls only.

Single stripe opal, above plus main station and Waukegan.

Opal marked E, above plus Chicago.

Opal marked H, above plus long distance.

Green opal, above plus private Lake Forest wire.

Whenever a call comes in to the hospital from long distance or from main station it must be connected only with the terminal phones rating outside connection and never with an interhospital phone (white opal). If the call is for a person or unit not rating an outside connection the operator will make explanation to the caller and either have party call the pay station on the first floor (Waukegan 2097) or the pay station in the nurses' quarters (Waukegan 2146) or connect the call with the officer of the day who will then determine the nature of the call and will authorize the necessary connection. These calls will not be transferred to wards or units except in emergency. The transfer of calls will be made for officers or for nurses (to nurses' quarters); for other persons the call should be made over pay phone.

White opal terminals do not rate outside connection. If an officer calls in an emergency from a white opal terminal he will give his name and rank to operator who will then give him main station only. When a party calls for main station, put the connection on a trunk line designated with the single stripe opal. Never use other trunks unless all single-strip trunks are busy. If the party calling does not rate main station connection, he will be so informed. When a party rating long distance or Chicago asks for either one, connect him with trunks designated by opals "E" or "H."

Enlisted personnel may not use any phone of the hospital for long-distance calls. There is a pay station in the main hall (Waukegan 2097) connected direct with Waukegan. In the nurses' quarters (new) there is also a pay station for long-distance calls (Waukegan 2146). Officers only may use hospital phones for long-distance calls and then only on lines designated "E" or "H." The operator on watch will ask the caller his name and nature of call, whether official or personal. This information will be passed to long-distance operator on the main station when the call connection is made. The direct Chicago wire will never be used for personal business except from the following places: Commanding officer's office and quarters, executive officers' office and quarters, junior officer's quarters. The direct Lake Forest wire, designated by the green opal is a private wire. Charges for personal calls will be made by main-station office.

The following rules will be observed:

- (a) Do not pull more than one plug at a time.
- (b) Do not play with the keys when not using them.
- (c) Do not leave the switchboard to do anything unless you are properly relieved.
- (d) Do not be late when relieving a watch. Always relieve on time.
- (e) Do not allow loafing in the telephone room. Report any unauthorized persons to the executive officer.

NOTES FOR OFFICERS.

Officers will report daily before 9 a. m. and will be ready for duty at 9 a. m. They will check in on the board in the executive office. They will be on duty until 4 p. m. unless excused. When excused they will notify the officer of the day to that effect. The officer of the day will keep a daily record of time of arrival and departure of officers. Officers will check themselves out on the board in executive office. Officers having serious cases under their care will be expected to visit them at any hour that such service may be required.

When a ward officer leaves the hospital or grounds, signed, written instructions regarding his serious cases must be turned over to the officer of the day. Except in cases of urgent emergency no verbal orders will be given for treatment. An order book is kept in the ward for this purpose.

Routine for officer of the day:

6.35 a. m. Supervise drill of hospital corpsmen.

7 a. m. Receive report of the night master-at-arms. General inspection of entire hospital.

7.30 a. m. Inspect breakfast.

10 a. m. Journal of the officer of the day to be completed and submitted to the administrative aid for inspection and for signature of the commanding officer.

12 noon. Dinner inspected.

2.30 to 4.30 p. m. Inspection of the hospital by the officer of the day.

5 p. m. Inspect supper.

7 p. m. Sick call.

10 p. m. General inspection of hospital with night nurse.

The officer of the day will not leave the office without being properly relieved.

Health records.—Ward officers will check up the names of patients with the list of health records to see that they correspond. Any health records in excess will be returned to the record office, or if possible to the proper ward officer. Particular care must be taken by officers to see that all entries made in health records are accurate and complete. If errors are found in previous entries or omissions noticed they should be corrected and initialed. All health records will be submitted on Wednesdays of each week to chiefs of divisions for their scrutiny. The records will be accompanied by a roster of patients in the ward with ward diagnosis and remarks as to condition. The chief of division will submit to commanding officer such record as he may wish to see.

Whenever an officer is ordered before a board of medical survey or a retiring board, the ward officer will see that full data in each case are recorded in the health record, and the medical survey should have complete data as to the condition of the patient, duration of the disease, and whether or not it is permanent, and disability is of sufficient gravity and permanence to warrant being ordered before a retiring board. A statement should be made as to whether or not the patient has been under observation and treatment a sufficient length of time to determine whether or not he will ever be fit for further duty and that the best recognized methods of treatment have actually and faithfully been used.

The question of exaggeration of symptoms, probably actuated by a desire to retire, should be given careful consideration.

Whenever a patient is to be discharged for disability, or for expiration of enlistment, the ward officer will see that he signs a statement in the health record immediately after last entry on history sheet.

"I hereby certify that I have (a) (no) disability entitling me to compensation under the war risk insurance act (cause of disability).

"(Signed) _____"

Requests for survey on personnel and request for change of diagnosis will be O. K.'d by the chief of division and turned in direct to the record office. Particular care must be taken that no change of diagnosis is made without notifying the record office on the form card.

Medical survey must be made under the diagnosis with which the patient is being carried. When change of diagnosis is necessary, the change will be made before the patient is surveyed. The health record will be complete and up to date for the information of the survey board. All patients surveyed will be notified that they are to see the Vocation Board representative before being discharged.

TELEGRAMS.

Telegrams from this hospital, official or otherwise, will be initialed by the commanding officer, administrative aid, or record officer only. In emergencies during the absence of the above-mentioned officers, the officer of the day will sign his name in full and add the words "Officer of the day." This is for the information of the telegraph office and must be strictly followed. The telegraph office will not honor telegrams unless signed in the above manner.

If a ward officer desires a telegram sent he will write out the exact condition of the patient, the necessity for the telegram, and put this memorandum on the administrative aid's desk, signed with his name and number of the ward. Except at night no telegrams will be sent except in the above way. At night all telegrams will be sent through the officer of the day.

MESSENGERS.

Messengers will be detailed for day-time service of the officer of the day. One of these men will be on duty from 8 a. m. until 9 a. m., four will be on duty from 9 a. m. to 3 p. m., two from 3 p. m. to 10 p. m., except Sundays and holidays, two men from 9 a. m. to 10 p. m. They will answer calls from commanding officer, executive officer, and officer of the day.

The officer of the day will have a messenger call for guard mail at the record office at 11 a. m. and 3 p. m., daily, except Wednesday and Saturday afternoons and Sundays.

Record office messengers will be on duty from 8 a. m. to 4.30 p. m.

INCINERATOR.

The incinerator will be open daily from 8 a. m. to 4 p. m. All rubbish from wards, including sputum cups, soiled gauze, etc., and all boxes and paper, will be burned at the hospital incinerator. Boxes may be broken up and stored alongside of the incinerator to be used for kindling in the officers' houses and in the galleys.

RED CROSS.

The Red Cross convalescent house is open daily from 11 a. m. to 9 p. m., for the use of the patients and others attached to the hospital. The library is under charge of the morale division. At all performances, decorous conduct will be observed. No bolsterous or disorderly conduct will be tolerated. No smoking will be allowed during performances.

At the conclusion of every performance or show where there is an orchestra or band present, the national anthem will be played.

OPERATING ROOM.

The operating room will be open daily except Sunday, from 8 a. m. to 9 p. m., Sunday from 8 a. m. until 12 noon. It will be ready at all times to receive emergency operative cases. All specimens removed at operation will be sent to laboratory for diagnosis and filing. No can of ether opened one day will be used on any succeeding day for anesthesia. All open cans of ether will be sent to the laboratory for laboratory purposes, fresh cans of ether being used for anesthesia.

SAFE.

The safe in the executive office will be open at 10 a. m. daily, except Sundays, for depositing and withdrawing money and other personal property left in the care of the executive officer.

BASEBALL.

There will be no ball playing whatever, except in the open spaces by Camp Ross and Navy Club No. 8.

POST OFFICE.

The post office will be open for sale of stamps and for money orders, registered letters, etc., from 9 a. m. to 10 a. m., and from 1.30 p. m. to 2.30 p. m., and will close for sorting mail from 10 a. m. to 11 a. m. and from 2.30 p. m. until 3 p. m. Mail will be delivered at 11 a. m. and 3 p. m.

ELEVATOR.

The elevator is for official business only. Officers, nurses, cripples, and hospital corpsmen or patients on official business are the only persons allowed to ride on the elevator.

The elevator detail will refuse to carry patients who are able to walk unless on official business.

NIGHT WATCHMEN.

The civilian night watchmen will report for duty at the officer of the day's office at 9 p. m., at which time they will start their rounds. They will make rounds beginning on the hour, every hour from 9 p. m. until 5 a. m., and will report off duty to the officer of the day at 6 a. m.

The inside night watchman's boxes are located as follows:

- | | |
|------------------------------|---------------------------------|
| 1. O. O. D.'s office. | 9. Basement, laboratory. |
| 2. Main floor, east end. | 10. Main floor, ice plant. |
| 3. Second floor, east end. | 11. Second floor, ice plant. |
| 4. Second floor, west end. | 12. Unit No. 2, northeast end. |
| 5. Main floor, west end. | 13. Building No. 14, north end. |
| 6. Basement, main storeroom. | 14. Galley No. 3. |
| 7. Basement, boiler room. | 15. No box. |
| 8. Basement, main galley. | 16. Unit No. 7, north end. |

The outside night watchman's boxes are located as follows:

- | | |
|--------------------------|---|
| 1. Unit No. 12. | 9. Unit 35, west. |
| 2. Warehouse, Camp Ross. | 10. Galley No. 2. |
| 3. Hospital laundry. | 11. Unit 29, east. |
| 4. Hospital Corps Brks. | 12. Unit 34, east. |
| 5. Storeroom No. 1. | 13. Galley, nurses' old quarters. |
| 6. Unit 16, north. | 14. Front corner, nurses' old quarters. |
| 7. Galley No. 1. | 15. Main garage. |
| 8. Unit 31, west. | |

MEDICAL SUPPLIES.

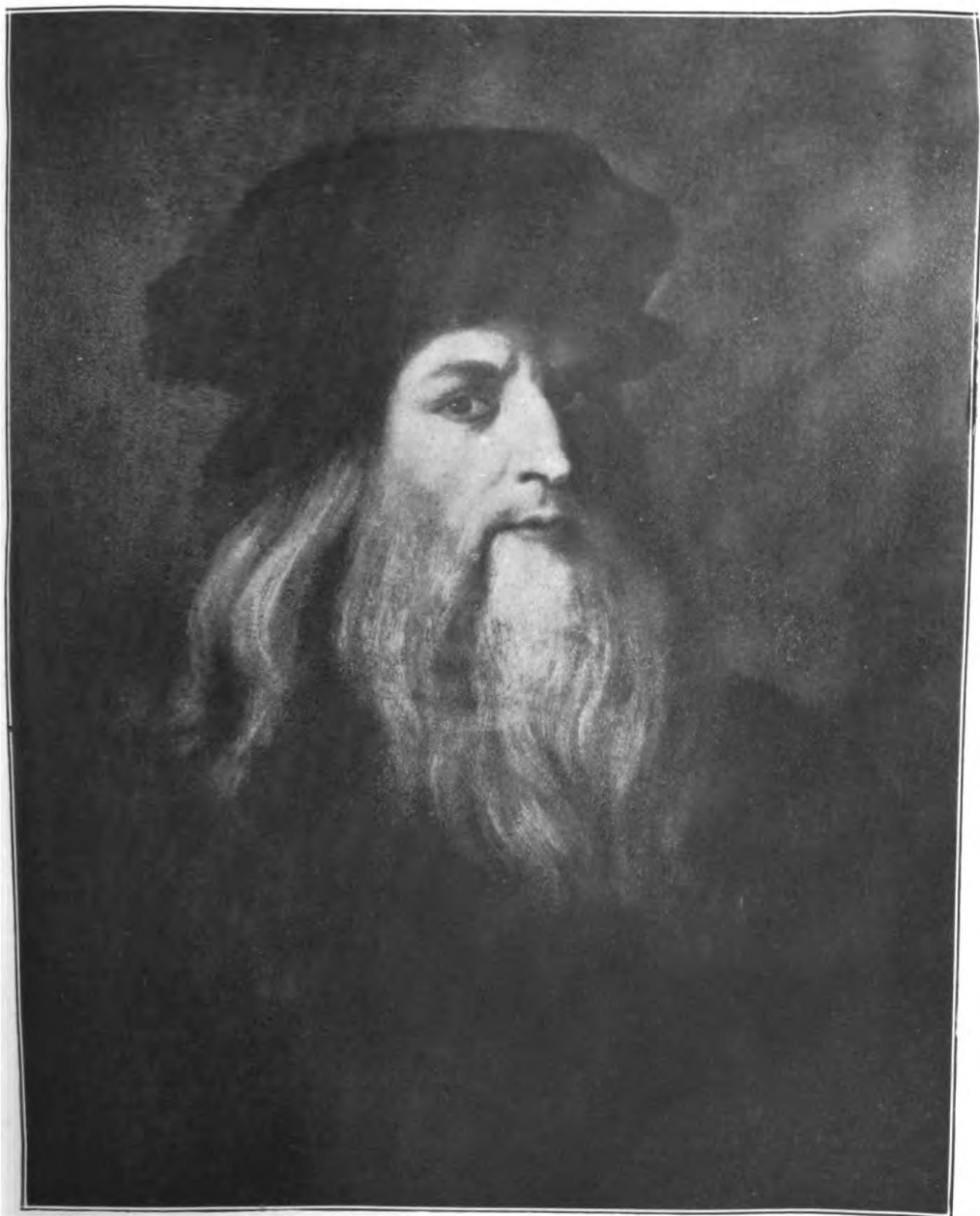
The keys to the medical storeroom will be kept in the possession of the hospital corpsmen on duty in the dispensary and storeroom. This will necessitate that one of the two will always be on duty day and night. In case it is necessary to open the storeroom or dispensary at night the hospital corpsman on watch will be sent for. The keys to the poison and liquor stores will be kept by matériel officer, who will personally issue these stores.

STERILIZER.

The sterilizer will be in charge of the hospital corpsman in Unit No. 2 and will be used for mattresses, pillows, and personal effects only. All mattresses, etc., to be sterilized will be delivered to the sterilizer house correctly labeled before 10 a. m. daily, except Saturdays and Sundays. They will be called for before 5 p. m. on the same day.

All linen, pajamas, blankets, and other washable material will be sterilized in the autoclaves at the laundry.

The medical officer having charge of contagious cases will see that the hospital corpsman preparing bags to go to the sterilizer removes all material and articles not sterilizable by heat and take the proper precautions against damage to any clothing. Washable personal clothing from contagious cases will be sent to laundry for sterilization and laundering.



Copyright by Alinari Brothers, Florence.

Portrait of Leonardo da Vinci by himself.

346-1



Copyright by Alinari Brothers, Florence.

Marco Agrati's statue of St. Bartholomew, Milan Cathedral. The saint has been flayed and carries his skin draped over his shoulder.

346-2

HISTORICAL.

SURGERY IN THE MIDDLE AGES.

By J. S. TAYLOR, Captain, Medical Corps, United States Navy.

Medicine in its more restricted sense offers throughout the Middle Ages a dark and gloomy picture, but it was irradiated here and there by a luminous thought, a pertinent suggestion, a shrewd guess about truth as subsequently revealed. Its professors contributed enormously to the general progress of science and civilization and were held in esteem by their contemporaries. Not so with surgery. Except in Italy, it was not even part of the functions of a reputable healer, and to practice it was to be branded as uneducated and unreliable and assume a badge of dishonor.

An inquiry into such a situation throws a cross light upon the life and manners of the times and forms an appropriate preface to an outline of those meager incidents which constitute the history of surgery for nearly a thousand years. To place upon the church's opposition to surgery the whole blame would be as great a mistake as to deny that indirectly it was partly responsible for a state of affairs that may well be deemed the cardinal error of medieval medicine. The clergy had originally been drawn into medicine as an inevitable result of humanitarian and charitable purposes, but the dangers arising from increased personal liberty and the concomitant temptation to be unduly diverted from legitimate religious work by the desire for gain were recognized by numerous church councils throughout the twelfth and thirteenth centuries. These councils first limited surgery to the higher clergy and finally forbade it to all ranks, and they did well. The surgery of the Middle Ages was inevitably in a backward state from having no solid basis in anatomy. The results of bad surgery were conspicuous and hard to hide, and the surgeon who killed or maimed his patient for life was lucky to get off with nothing worse than a ducking or a sound cudgeling. Such incidents could not but discredit the cleric.

The physicians, and still more the surgeons, of the Middle Ages were, during certain periods and in certain countries, held accountable by law for their performances and malpractice was severely punished. The old Visigothic laws forbade the bleeding of a female patient except in the presence of another woman, preferably a mem-

ber of her family, though in extreme situations any worthy neighbor would do to enforce the observance of the proprieties. Before a serious case was undertaken definite contracts and pledges were made on both sides, but there was one provision which considered the rights of the practitioner. Except in a case of homicide he was not to be imprisoned until he had been heard in his own defense. In the sixth century, a King of Burgundy whose wife had died of plague carried out her dying wish and executed on her tomb the physicians who had had the bad luck to be assigned to the case. In the thirteenth century a man of prominence in Bologna was so seriously injured that it proved hard to find any one willing to treat him. Finally Ugo of Lucca or else Rolando of Parma cut off the extruded lung and healed the wound, but only after solemn guaranties had been given by a large number of the patient's friends that the surgeon should come to no bodily harm, whatever the outcome. King John of Bohemia, the blind hero who fell at the Battle of Crecy (1346), had lost his eyesight through the meddlesome surgery of a wandering specialist. He caused the guilty party to be drowned in the Oder. In the same period an oculist who failed to relieve a lady of Montpellier of her distress was pursued through the streets at night by her incensed husband flashing a naked sword. In the fifteenth century a King of Hungary advertised for some one to cure him of an arrow wound, the conditions being knighthood and much money for success and death for failure. An Alsatian undertook the extraction of the arrow on these hard terms and won the prize.

It is to be remembered in justice to royal and popular behavior toward physicians that for centuries there was no uniform system of licensing a man to practice and that while it conferred distinction to be a graduate of a university this was not essential to setting oneself up as a doctor and therefore patients were often at the mercy of self-styled healers, who had scant justification for assuming such a title. To be affiliated with the church was a great protection in some ticklish situation, but these same situations were calculated to dishonor the clergy and destroy its prestige. Hence the church, while increasingly opposed to having men in holy orders prescribe, was justified by policy and sound common sense in putting a positive interdiction on the knife, though the ban was long more honored in the breach than the observance. The unintentional but inevitable consequence of this authoritative distinction between the two branches of general medicine was far-reaching and serious. For centuries learning and education had been, through force of circumstances, the exclusive prerogative of the church. Practitioners were tonsured and gowned and constituted a real caste. When surgery was forbidden to them it naturally fell to outsiders who were inferentially,

and at first in fact, without the knowledge or the standing of the representatives of the church.

Another factor in the case was the powerful influence of the Arabians who had a racial disinclination for radical interference with the body through the bias of a strongly fatalistic religion. They had, too, the mistaken notion that it was more compatible with the physician's dignity to let the patient go untended than to employ for him ministrations which soiled the hands.

In Christian lands something in the very conception of religion created popular prejudice against investigating the secrets of the human body by dissection and, at first, made even the professional man timid. Except in the punishment of heresy and other crimes the orthodox believer shrank from deliberately breaking up the molecular arrangement of a body held to be "vile" because the begetter of passion and sin and yet inspiring a certain unreasoning reverence since it was due to be "raised incorruptible." Mondino himself "to escape burdening his soul with mortal sin did not yet venture to open the skull" (Baas), perhaps viewing it as the abode of the soul.

Again certain elements in human nature have to be considered. The physician with his internal medications and the pills which "work while you sleep" has powerful coadjutors in manners of pomp and mystery. When his measures fail there is a door of escape for him in the assertion that the drug was weak or found no response in the body of the patient. From the days of theurgic medicine the surgeon who worked in the open, directing the knife with his own hand, was at a disadvantage beside his secretive brother allied to the gods. In the course of centuries clerical medicine inevitably inclined to take on some of the attributes of theurgic medicine and to breed haughtiness and exclusiveness in its ministers whose every act seemed to justify the language of Job to his comforters: "Ye are the people, and wisdom shall die with you." That surgery to-day has such a strong hold on the imagination of the public and forms so frequent a theme for novelist and dramatist is undoubtedly due in large degree to the elaborate ceremonial of aseptic technique. The gloves, the mask, the cap, and the gown, and the inviolability of the surgical field to all those who are unclean give a touch of magic and mystery that was wholly lacking when the operator of the dark ages unsheathed a knife and plunged it into quivering flesh while crowded and elbowed by curious and anxious friends and relatives who had to be pledged in advance not to make trouble if the result was untoward, for in surgery if things go wrong it is the operator's fault, while in medicine it is the will of God. On the other hand the element of suggestion was utilized to the full by medieval physicians, the sacerdotal garb being a powerful accessory in this direction.

But the great outstanding fact behind the ill success and ill repute of the surgeons was their lack of knowledge about the structure and functions of the body which they had to invade. The consciousness of their deficiencies made cowards of the more intelligent or more scrupulous. To operate was to take huge chances, and the so-called surgeons had ever before their eyes the example of physicians avoiding all risks and yet earning fame and riches. (Even the old Hippocratic school, the emblem of the noblest and best in medicine, drew the line at cutting for stone, an undertaking strictly forbidden in the Oath itself.) And so we find even the majority of the professed surgeons limiting themselves to the treatment of wounds and certain kinds of injuries. By thus restricting the field of their endeavors, aping the doctors and striving to rival them, the surgeons were false to themselves and their art, and in treating surgical cases medically they were no better than the physicians who attempted to use a sort of feeble surgical medicine of their own invention. Still we must in justice admit that they were to a certain extent the victims of the circumstances already adverted to. Historians ascribe great merit to the men who led the surgical revival of the thirteenth century because they protested against the separation of surgery from medicine. They saw the trend of events and cried out, though not directly involved, as they were themselves clerics above the reproach of being unlettered adventurers. The Commentary of the Four Masters in its opening pages deprecates the threatened innovation. Bruno boldly voiced his contempt for squeamish celibate clerks afraid to soil their hands. Saliceto, Lanfranchi, and Mondeville warned of the baleful consequences to be apprehended; but these men were Italians or educated in Italy where, remarkable to relate, adherence to church requirements was often far less strict than abroad. The exclusion of clerics from surgery by the Council of Tours and the uncompromising attitude of the faculty of Paris rang the death knell of surgery as a respectable calling everywhere but in Italy.

But as demand always creates, sooner or later, a supply of needed commodities or service, so, upon the repudiation of their obligations by the professed surgeons who followed in the wake of the more fortunate as well as better endowed revivers of surgery, the barbers sprang into prominence and rapidly extended their manual dexterity beyond shaving and bloodletting. Soon we see them claiming equal privileges and consideration with the surgeons. A long struggle ensued between these lesser factions, and events followed very much the same course in England as in France, the two countries being far nearer to each other in thought and manners up to the close of the fifteenth century than one would suppose possible unless familiar with the dynastic and other ties that bound them. The barbers tri-

umphed to the extent of being recognized as lawful ministers to all but mortal cases and sustained to the so-called surgeons a relation very much like that of the apothecary of a later England to the high and mighty physician.

Malgaigne's observation that the injunctions of the church were often least heeded by those nearest the seat of its power is illustrated by the career of France's great surgeon, Guy de Chauliac, a cleric who flourished for years at Avignon and served more than one Pope. The saying of Tacitus "*Omne ignotum pro magnifico est*" and its converse, "familiarity breeds contempt," are pertinent when we come to consider the marked difference between the position of surgery and surgeons in Italy and in the rest of Europe, Germany representing the greatest extreme of ignorance and poverty in this respect. The attitude of Italians and more particularly of the Romans, a religious but essentially unspiritual people, to the Holy Father has always been marked by a strange mixture of respect and irreverence, and they have always enjoyed a liberty and a license unknown in other Roman Catholic countries, Rome and the Vatican itself affording protection to many a talented heretic or outlaw who would elsewhere have felt the scourge and the flame.

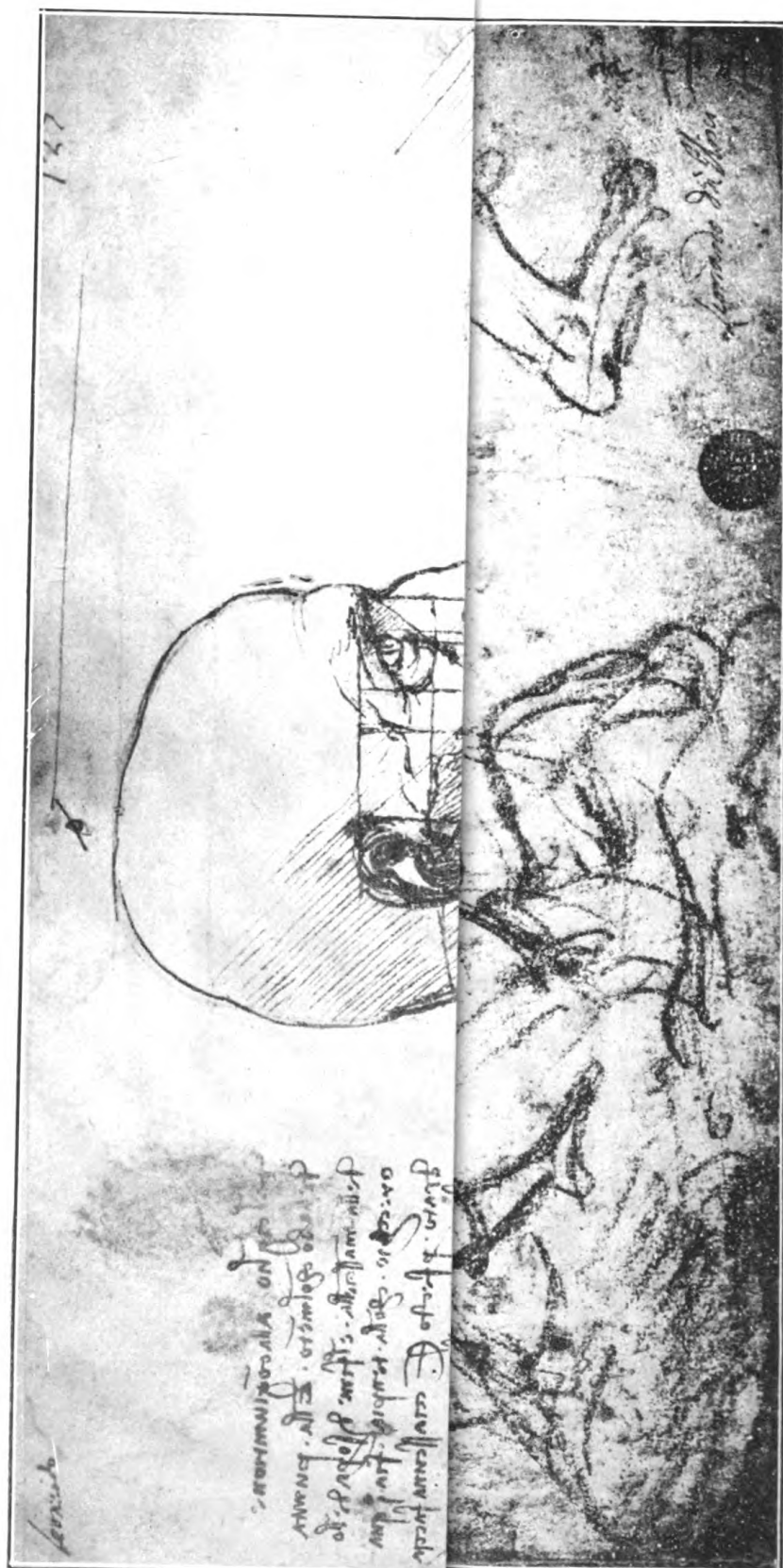
Italy was the scene of the long struggle for supremacy in temporal affairs between pope and emperor; witnessed the rise of a multitude of small political units and free cities, many of which had contracts with surgeons for service in military expeditions; dreamed of political freedom through the inspiration of Dante and Petrarch and had its brief example of democratic rule under the visionary Rienzi; lead in the trade and commerce of the Mediterranean; profited financially by the crusades, its ports serving for the embarking and disembarking of troops; was the birthplace of art and the center of European civilization. Besides these broadening and liberalizing factors, there was the direct and powerful influence of Salerno, a lay school from its inception, which flourished for centuries before being emasculated by the dominion of Arabian thought and recognized the importance of surgery by prescribing a longer and more exacting period of training for aspirants in that field. An Italian of the twelfth century, Gerard, of Cremona, travels to Spain and bequeaths to the world a translation of the work on surgery by Albucasis. A century later Frederick II founds the University of Naples, provides for periodic dissections and instruction in anatomy in his dominions as a groundwork for surgery. In contrast to this Paris forbids the surgeon to prescribe any internal remedy, and in 1350 demands of its regular scholars an oath not to engage in surgery. Fifty years later Montpellier followed the example of Paris.

The fact that Greek traditions, names, customs, and thought survived for so long in Sicily and the extreme south of the Italian main-

land must have helped to make the Italians less inclined to despise the manual operations of surgery. In this connection one recalls that Roger was from Palermo, Bruno from Longoburgo in Calabria, Nicholas from Reggio; that in Sicily and Calabria were certain families who handed down from father to son the plastic art of restoring noses, and that in Umbria there flourished a number of families in which the technique of lithotomy was a hereditary secret.

Italy was faithful to the example of the Greeks in esteeming honorable the hands that wrought well, whether they restored the damaged body or fashioned one of beauty in marble. The thirteenth century saw the birth of Cimabue, the first modern painter, and of Arnolfo da Cambio, the father of Italian architecture. They were followed by Giotto and Orcagna, realists of pious and fervid imaginations, and by a long succession of handicraftsmen who were entitled by the work of their hands to consort with emperors, kings, and popes. Pollaiuolo painted pictures, but he did niello work and designed medals, too, and his superior knowledge of anatomy was derived, so Vasari tells us, from many dissections. Verrocchio could fashion a Colleone, "the noblest equestrian statue in the world," and gain rather than lose standing by making jewelry, statuettes of silver, effigies of wax and wood. Benvenuto Cellini cast statues in bronze, breaking his furniture in frenzied haste to keep the fires going beneath his mold; but he also made medallions, cut intaglios, decorated gold drinking cups for beauty-loving cardinals. Leonardo da Vinci painted the Last Supper and the Gioconda but was an anatomist without superior. The artists who sought at the spezzieria, or spice shop, the crude pigments which they worked up with their own hands into paints—Masaccio was actually a member of the guild of spezzieri before he joined the guild of painters—frequented also the hospitals, and dissecting rooms, and the surgeons' offices to learn something of surface and muscle anatomy. The guild of painters and the guild of surgeons and apothecaries were closely associated in the Florence of the fourteenth and fifteenth centuries. Painters and sculptors associated with doctors and surgeons in a land where to this day the term "artist" includes every one who accomplishes something of superlative usefulness or beauty by putting his soul into the task.

The association of art and medicine (in its larger sense) is adverted to here as one of the reasons why surgery—like painting and sculpture, a profession calling for manual dexterity—stood higher in Italy than elsewhere, for Italy was the cradle of art. We note, in passing, that this relation was one of mutual benefit. The artist, held in higher repute in Italy than in the rest of Europe, not only gave respectability to the study of anatomy but, to the great profit of medicine, stimulated that study as soon as he himself passed from the stage of arbitrarily creating human figures to that of representing natural forms



Sketches and mirror writing by Leonardo da Vinci.

realistically. (Medicine was to pass through an analogous metamorphosis of methods, but much later and more slowly.) The early artist was under obligation to the medical man for opportunities to study anatomy. He made returns for this by illustrating the published works of those who taught surgery and anatomy.

One of the earliest printed medical books containing woodcut illustrations was the *Fasciculus medicinae* (Venice, 1491) of Johannes de Ketham, who practiced in Venice about that time. The woodcuts were for a while ascribed to Mantegna but have recently been shown to be derived from manuscripts of 1400 A. D. This was the case with most of the illustrated surgical and medical works that came from the earlier press. Too often the anatomical illustrations prior to the Renaissance took the form of mere diagrams of the human figure, related in their general style to crude Arabian, Persian, and Thibetan types. But in the libraries of Rome, Florence, Bologna, Venice, Turin, Chantilly, Paris, Oxford, and Dresden there are to be found drawings and illuminations which, as Garrison has well said, enhance one's opinion of the early Italian surgeon who is shown reducing fractures and dislocations, removing arrows and polypi, trephining and cutting strictures and fistulas.

The informal but vital association of art and medicine reached its culmination with the advent of the Renaissance when we find Da Vinci, Raphael, Michel Angelo and Titian making anatomical plates. Da Vinci, one of the world's universal geniuses was (like Michel Angelo) an earnest student of anatomy. He collaborated with Marcantonio della Torre, professor at Padua and Pavia, but the bulk of his work was under his own inspiration, to gratify his insatiable thirst for every form of knowledge. Over 750 of his sketches, not only of surface anatomy but of the nervous system and viscera, based on 50 dissections, a huge number for the period, have been collected and published in our time. He dissected in the hospitals of Florence, Milan, and Rome. In the latter city he worked for two years, but his dissections at the Santo Spirito Hospital furnished the excuse for aspersions and misrepresentations on the part of two German handicraftsmen employed by him. He lost the favor of the Pope and left the city under charges of body snatching and impiety.

Finally it must be remembered that surgery, whether, judged by our standards, it was good or bad, was regularly and continuously taught in the Italian universities whereas at Paris it was excluded almost from the start except in very inert and bookish form. Montpellier eventually followed suit and at the end of the fourteenth century, with the return of the papal court from Avignon to Rome, closed its once famous school of surgery which was not to be revived with any degree of luster until the days of La Peyronie. Vienna was the first of the German universities to institute lectures on sur-

gery. There, as early as the fifteenth century, the subject was taught in a major and minor course, in Latin and the vernacular, respectively, following the precedent of Salerno under the laws of that by no means orthodox believer, Frederick II. This marvel among medieval rulers, who flouted the Pope and cultivated the lore of the Orient, enacted (1224 A. D.) measures for the regulation of medicine in his Italian dominions and these provided for a "higher" and a "lower" surgery. Candidates for the first qualification had to know Latin and give special attention to anatomy (such anatomy as was to be had) and the examination was conducted by three professors, one of whom was the teacher of surgery. Both types were restricted from treating internal diseases. The schools of Italy inherited from Salerno¹ the practice of having schools of surgery which ranked with the others in the medical curriculum. It was in Italy that anatomy had a partial resurrection under Mondino (born 1276) after its decay in Alexandria and a resplendent new birth in the Renaissance, culminating in the achievements of Vesalius whose five years as prosector at Padua prepared him for his epoch-making *De Fabrica Humani Corporis*. In France, as we shall see later, anatomy was taught by physicians, and the practitioners of surgery were not admitted to the teaching faculty.

From the days of Pitard and Mondeville at the close of the thirteenth century, excepting only Guy de Chauliac in the middle of the fourteenth, France did not produce a single reputable surgeon of any account until the sixteenth when Ambroise Paré came on the scene and gave an entirely new turn to affairs. There was some good surgery done here and there by barbers and quacks, but the surgeons did what they could to keep the former from the odor of sanctity and the latter were universally despised. This barren period deserves some attention because its salient characteristics hold for Spain, Germany and England as well.

First in point of reputation, education, and refinement in Paris stood the physicians proper, a body of narrow, bigoted, and domineering men who abominated surgery and hated the self-styled surgeons who professed to practice it with a malignity which no modern professional jealousy could even faintly rival. Next to the medical faculty, but with a considerable interval between, came the professed surgeons who aspired not so much to develop their art as to advance their own standing and be received on an equal footing with the learned physicians. To this end they deployed a cunning, a perseverance, an ingenuity that could be condoned had it been less selfish. In the days when Lanfranc, Pitard, and Mondeville lamented the attitude of the Paris faculty toward surgery the

¹ U. S. Naval Medical Bulletin, vol. 12, No. 2, p. 225.

art had for its expositors men who like themselves had graduated at reputable schools and deserved the confidence of the public. Their successors, alas, were of a very different type. The surgeons associated in Paris under the name of the Collège de St. Côme were surgeons in name only. The third class of practitioners, the barbers, wanted to do genuine but minor surgery and naturally regarded the surgeons as dogs in the manger. The surgeons declined the humble functions of bleeding and cupping, but had no stomach for heroic measures. Even to set a broken bone or reduce a dislocation was beneath their dignity and these manipulations were relegated to a fourth class, the lowest of all, associated in the mind of the king and in the opinion of all worthy citizens who could pay the fee of smother-tongued physician or obsequious and versatile barber, with robbers, murderers, coiners of false money, and spies.

One wonders therefore what the so-called surgeons did actually undertake. Apparently their main function was to treat ulcers, wounds, and injuries, particularly those which did not require intervention with the knife, and such diseases as might be called surgical. But in this type of practice, with ointments, salves, and internal medication as their instruments, they of course trod on the toes of the tonsured and celibate medical graduates and afforded them a far more legitimate ground for hostility than belonged to the surgeons in relation to the barbers whose field was coveted by none.

The records of St. Côme, both authentic and fabricated (for its members did not hesitate by every means in their power to make themselves out a far more venerable and royally sanctioned body than the facts attest) and the recorded edicts of King and Parliament set forth a struggle between these three factions covering 400 years. This struggle was marked by occasional truces and periods of patched-up peace and ended in the final recognition of surgery as a legitimate calling, but only after the barbers had become barber-surgeons and the unorganized and lowly performers of real surgery, the itinerant quacks, had by ever-increasing skill and popularity stimulated the alleged practitioners of it to become so in fact.

Philip the Fair, in 1311, ordained that no surgeon or *surgeoness* should engage in any form of surgery until diligently examined and approved by the master surgeons of Paris, duly convened at the call of "our well-beloved Jean Pitard, our surgeon." This mandate was designed primarily to restrain the activities of all those unlettered, irregular, unorganized folk who made up what might be called the "fourth estate" of the profession. These men wandered afoot from fair to fair, from market place to market place, picking up an honest penny here and a dishonest one there by curing a corn, twisting a bone or limb into place and occasionally reducing a hernia or cutting out a stone by the perineal route. They could talk fair to a disap-

pointed peasant and were adepts at decamping overnight if things went amiss with a chance patient of high degree. This statute was promptly seized upon by the surgeons and made the pretext for examining all aspirants to their profession so that they became a self-determining body. When later Charles V of France exempted them from certain civic obligations on condition that they attend the poor and dress the wounds of such as could not be admitted to the hospitals they cleverly introduced into his edict the words "licentiate" and "bachelor," designations previously reserved for the scholars of the university.

Long before these ordinances were passed the physicians had ordained that no Jew should practice medicine or surgery on a Christian and required that candidates for surgery should appear before them. At the same time no one could receive academic honors without first binding himself by solemn oath never to engage in any manual operation. The faculty not only forbade surgeons to do any prescribing but held all professional instruction to be their own exclusive domain. Thus real surgery was not taught at all in the classrooms of Paris.

The College of St. Côme was in no sense a college but a guild or brotherhood with some of the functions of a State or county medical society. It tried to protect its members from the encroachments of rival guilds like that of the barbers and from the high-handed ways of the faculty, regulated the relations of surgeons and their apprentices, and held periodic celebrations and banquets and organized picnics in the country which wives of members could attend. The dinners and country excursions were a prominent feature of the guild life and it was especially provided in regard to them that when a member went with his wife he paid a single fee; but if he could not attend, even by reason of sickness, he had to contribute to the general expense fund, and if, under such circumstances, his wife took part, she had to pay for her own dinner. (In the matter of dinners the members of the regular faculty were not far behind. In the fifteenth century they enjoyed an annual visit to the public baths of the city followed by a banquet at the charge of the undergraduates.) The finances of St. Côme were further augmented by levying a tax on the poor "cutters" of Paris and vicinity. Whenever one of these journeyman surgeons was authorized by the college to operate for stone or rupture he paid a definite stipulated sum into the coffers of the fraternity.

The professed surgeons acquired their meagre art not in the regular schools of medicine but by a course of apprenticeship, paying liberal fees, of course, as they went along. In the hierarchy of St. Côme only the masters, or those members who had behind them at least four years of experience, were entitled to take an apprentice. When the apprentice passed to the grade of bachelor the fees began

to multiply. On receiving his license the young surgeon made donations to the guild in money or kind—bread, wine, pastry, geese, mutton, candles, and so forth. Most onerous of all were the obligations devolving on the recipient of the title of master. Each existing master expected from him a new scarlet cap, or its equivalent in money, and heavy violet gloves trimmed with silk. The more numerous bachelors likewise expected a pair of gloves apiece, and when the ceremonies were over at the chapter house of the Hôtel Dieu, a dinner to all the members of the society was in order, and it was his privilege to pay the bill.

As often as one or another of the three factions in Paris acquired some new and valued prerogative its rivals would look about for an appropriate means of retaliation. Thus, when the surgeons managed, temporarily, to curtail the liberty and pursuit of happiness of the barbers, the faculty would espouse the cause of the latter. Ordinarily their most powerful champion, a veritable friend at court, was the king's barber who, himself the chief examiner for the barber's license, saw to it that his fellow-craftsmen did not suffer.

An ordinance of 1372 speaks of certain persons who had sought to defraud the barbers of their professional rights and distinctly empowered them thenceforth to undertake surgery without let or hindrance from any source so long as they confined themselves to wounds which were not mortal. The reason assigned by the King for this enactment, made after careful deliberation with council and advisers, was the need for his poorer subjects to have access in their distress of body to some competent healer less difficult to come at than the great surgeons, persons of high estate and lordly fees.¹ The surgeons resented this extension of the barbers' privileges and appealed to the university but got little for their pains, as that body, under pretence of coming to their assistance, announced that they would themselves see to it that no unauthorized or unqualified person should practice surgery. They undertook to look out for the rights of the surgeons provided the latter promised to behave as humble and dutiful pupils and wards of the university. This was far from satisfactory to the surgeons and by 1423 they succeeded in extracting from the provost of Paris an injunction against the practice of surgery by any but duly qualified surgeons, "even barbers" being excluded. The order was proclaimed through the streets of the city to the notes of a trumpet, but the triumph of St. Côme was brief, for within a year all the rights of the barbers were restored to them.

In the reign of Louis XI his famous barber and favorite, Ollivier-le-Dain was able to guarantee the barbers against any encroachments on their rights and from this time on they seemed to have advanced

¹ The situation had its parallel in England in the sixteenth century. See p. 361.

without serious opposition. Indeed they were aided and abetted in every move by the faculty and the university who never abated one jot in their determination to regulate all professional matters in the capital. By the close of the fifteenth century behold the faculty establishing courses in anatomy for the barbers and even reading aloud to them passages from De Chauliac and other writers on surgery and following the Latin by a few appropriate explanations in French, most necessary explanations, indeed, considering that their new disciples could not understand a word of the original.

Another blow to the prestige of St. Côme followed hard on this one. In 1505 behold a candidate for license as surgeon applying to and being examined and passed upon not by the men of his own tribe but by physicians proper in contravention of the surgeons' most ancient rights. Immediately, in suppliant guise, their bonnets in their hands, the surgeons present themselves before the physicians in solemn conclave assembled in the Church of St. Yves to declare that if there was any talk in the streets of Paris to the effect that the surgeons were not the good and loyal pupils of the faculty it was false. If they themselves had ever dreamed such a wicked thing they would go to bed and undream it. Thus they protested and with honeyed words sought to conciliate their powerful rivals.

The point at issue, of course, was as to who had the right to license a surgeon to practice. The surgeons were dismissed with a solemn promise that the matter should be weighed and pondered and justly decided at a future meeting, but everything had already been formulated in advance and on this selfsame day the barbers received from the faculty their new status of barber-surgeons. Much wrangling was provoked by this revolutionary step, but the surgeons struggled in vain to avert their fate and in the end some sort of an agreement was reached and the practical outcome was that both surgeons and barber-surgeons came regularly into good standing with the faculty. Both were to receive instruction and be affiliated with this highly esteemed body and under its control. Each branch now had its duties and privileges clearly defined, and while supremacy over all belonged to the physicians the surgeons were allowed a voice in the destinies of the barber-surgeons. Most radical change of all, the surgeons were to come into the faculty and the barber-surgeons into the College of St. Côme.

It was scarcely to be expected, however, that elements so dissociable should at once coalesce. In Paré's time, even dissections done by surgeons were legal only if two doctors of medicine were present! They "interpreted the anatomy and dissection in the usual manner."¹ The College of St. Côme—whose history may as

¹ When Charles V, Emperor of Austria, initiated reforms in his standing armies and made provision for medical service for the common soldiery, a medical man was required to supervise the work of the surgeon in the field.

well be concluded here—attempted to have its members designated professors and the necessary order was actually signed by the King, but the Parliament of Paris refused to register the decree. Paré, however, dissected at his pleasure and his favor at court was so great that the faculty was intimidated and for the first time permitted the surgeons to teach anatomy. A century later Louis XIV, who had to thank real surgery in the person of Felix, for the cure of a chronic affliction (fistula in ano) which had withstood an infinity of medications, amalgamated the surgeons and barber-surgeons. The terms had already become synonymous in England. Mareschal, one of the successors of Felix, did much to raise the status of surgeons and from then on they had to be men of education. (It is not surprising that Louis XIV also took no small interest in obstetrics.)

Finally under Louis XV several chairs of surgery were established for the brotherhood of St. Côme which now assumed full charge of surgical teaching. The faculty of Paris broke into open revolt at this reversal of affairs and marched in solemn procession, despite the cold and snow, to storm the guild's quarters. Happily the mob interfered. La Peyronie, the founder of the Academy of Surgery, himself endowed a school for surgery under the St. Côme and secured liberal provisions for his beloved Montpellier, where the beneficiaries under his liberal bequests had to lecture on obstetrics to surgeons and midwives.

In the large provincial cities of France things surgical had advanced more rapidly, for in them the barbers seemed to have been organized at an earlier date or at least to have acquired sooner the recognition which they deserved as the progenitors, along with the strolling "cutters," of the real surgery that was to blossom forth later. In some sections the barbers were independent of the King's barber and royal charters. In others they hung on court favor and on the precedents established in Paris. In Bordeaux, however, they enjoyed singular freedom to manage their own affairs. The candidate for a barber's license in that city underwent no mean ordeal in establishing his title to competency. To begin with he had to spend a week in each of the shops of the several examiners doing all manner of things pertaining to his art such as fashioning lancets and sharpening them. The examiners had to satisfy themselves that the applicant was of good physique and possessed good vision and a steady hand. Then came a public examination in the town hall before the mayor and other city dignitaries. He must show himself proficient in sewing up wounds, acquainted with anatomy, and the treatment of fractures, dislocations, fistulas, and different kinds of

wounds. He had to demonstrate, besides, some acquaintance with the commoner maladies and their treatment and prove himself an adept at compounding prescriptions, making plasters and salves, and collecting the plants and herbs necessary thereto. At Toulouse the requirements were even more stringent. The would-be licentiate had to dwell for six years under the supervision of the examiners. This long apprenticeship concluded he made his four lancets and submitted them to be tested. If not satisfactory the points were broken and the candidate could not present himself for another year. However, if the lancets were well made he could pass on to a practical examination which consisted in bleeding a patient and then shaving one with a new razor. The oral test related to surgery and cupping.

At Montpellier the barbers had assumed something of the authority which the Paris surgeons coveted so ardently, and had full control of the humbler brethren designated "cutters" and "incisers," who, along with tooth pullers, were forbidden the city entirely unless duly licensed after examination. Tours also had its organized guild and likewise Carcassonne. In 1400 we find representatives of the latter city clamoring for a new charter, inasmuch as their original one had disappeared when the town was sacked by the English. Their banner showed St. Catherine in her wheel of knives and was emblazoned with fleurs-de-lys. The royal charter of the barbers of Rouen applied only to the exercise of their function within the city limits, and they were actually prohibited from going about through the countryside rattling their basins. In our modern barber pole we have a reminder of the days when the barber was the expert bleeder of the community, the several colors perhaps standing for the arterial and venous blood and the bandage or the soap suds, respectively.¹ For the most part the barbers of continental Europe had for their patrons Sts. Cosmas and Damianus (Christian physicians of the third century, who suffered martyrdom during the persecutions under Diocletian), and these tutelaries belonged to the surgeons as well, to some of the German faculties, and to the medical school of Vienna. At first the barbers had had as their emblems all sorts of common articles, such as combs and scissors, but with rising importance they adopted the pewter bowl, convenient to hold under the lathered chin or for receiving blood from a vein. In like manner the surgeon's device had been originally a polished metal bowl and his banner bore three of them. When he sought to rival the physician and donned a long robe to distinguish himself from the short-coated tonsorial artist he substituted three ointment boxes for the paraphernalia of the discarded rôle.

¹ In England a pole with blue and white stripes was the common sign of barbers and surgeons, but the latter were entitled besides to a gallipot and a red flag.

Originally the authority of individual barber guilds was derived from the King, from local city magistrates, or feudal lords, but during the long minority of Louis XI, the regent's barber, one Colmet Candillon, took things in his own hands and brought the guilds, one by one, under the direct control of royalty, with the King's barber as agent.

It is remarkable how closely the course of events in England paralleled those in France. In the fourteenth century some of the barbers "exercising the faculty of surgeons" organized a guild. There was also a small and highly exclusive guild of surgeons dating from 1368. This one combined with the physicians in 1421, but the union was short lived. In 1462 the barber-surgeons were chartered as a company and empowered to examine candidates and superintend the sale of drugs. The guild of surgeons proper was chartered in 1492. In 1511 the surgeons and barbers were affiliated by an act, passed under Henry VIII, which prohibited the practice of medicine or surgery in London and vicinity except by persons duly examined and licensed by a board of four doctors or surgeons under the presidency of the Bishop of London or the Dean of St. Paul's (the clergy again)! Outside of London there were other local boards, each under a bishop.¹ The year 1518 saw the licensed practitioners of medicine associated as a college of doctors, and under Bloody Mary this became the Royal College of Physicians of London, which presently drew up a definite code of ethics. In 1540 the guild of surgeons and the barber company were amalgamated as the United Barber-Surgeon Company with full authority to dissect, Thomas Vicary being the first master. The union was not very satisfactory. Owing to the greed of the surgeons and their neglect of the poor, legal restrictions to their advantage were temporarily annulled in 1542 so that all the King's subjects were entitled to minister to sores and wounds "according to their cunning," provided they "had knowledge and experience of the nature of herbs, whether obtained by regular study or divine favor." In 1745 the surgeons were formally and forever separated from the barbers, and the Royal College of Surgeons of London was established. England was thus but two years behind France in emancipating the wielders of the scalpel. In Ireland the guild of barbers was chartered in 1446, combined with that of the surgeons in 1572 and separated in 1745. The Royal College of Surgeons of Dublin was organized in 1784.

¹ The bishop doubtless took into consideration the orthodoxy of the candidate. This was certainly true in the case of licensing midwives, as they might be called on to baptize the infants they delivered.

The first surgeons of importance in the Middle Ages¹ were Roger (Ruggiero) of Palermo (or Salerno), and his pupil, Rolando of Parma, graduates and worthy exponents of the great lay school of Salerno. Roger wrote a "*Practica Chirurgica*" (1180 A. D.) based on Albucasis, but with added original and clinical material, which was reedited by his disciple, Rolando Capelluti, and the two works were the basis of the *Glossæ Quatuor Magistrorum*, or Commentaries of the Four Masters, an important contribution of unknown authorship. It may have been composed by some of the regents of Salerno or have come from the pen of a single Italian or Frenchman.

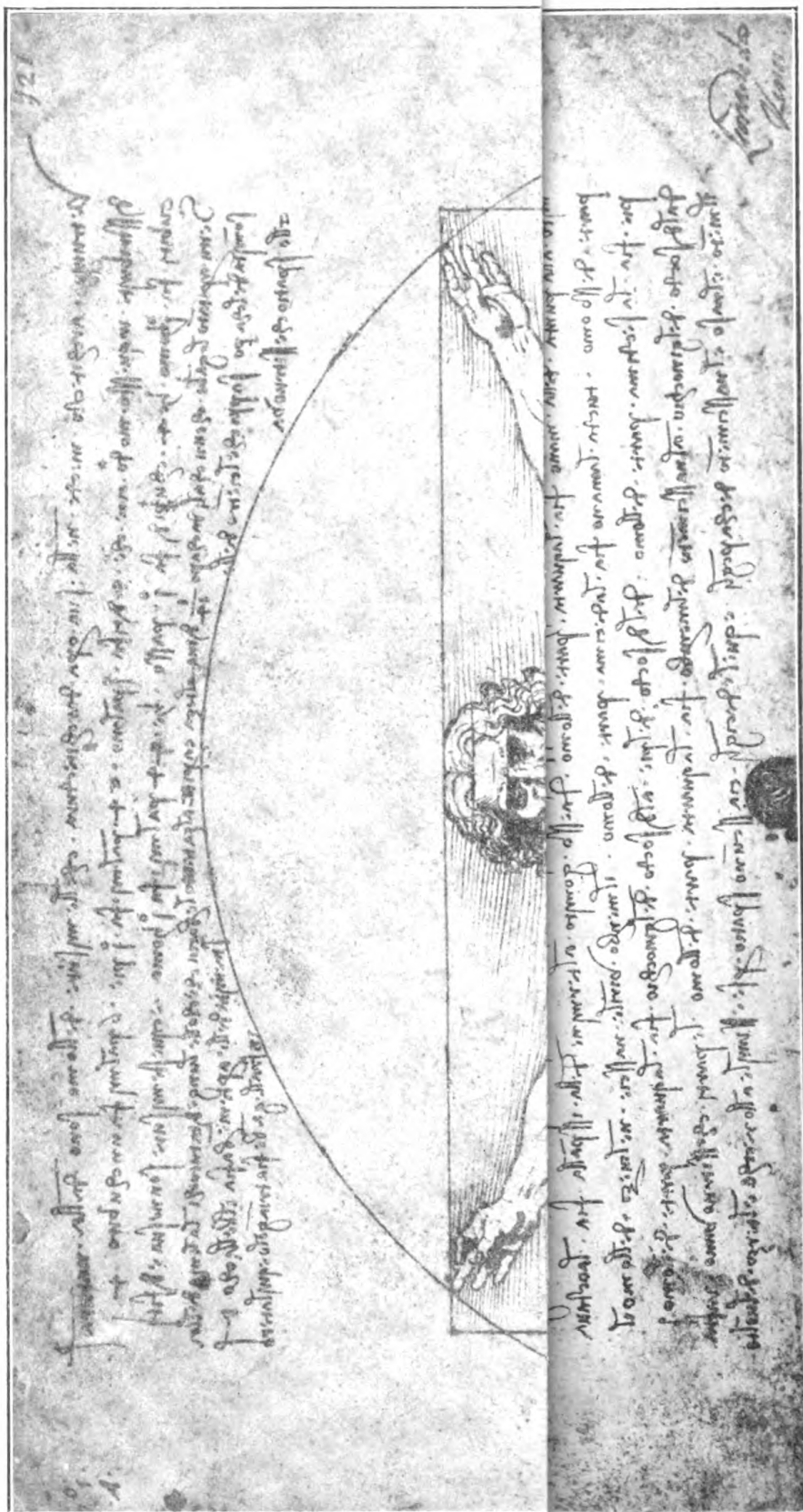
These Italian pioneers treated wounds by wet dressings, poultices, salves, and fomentations to promote suppuration; hernia cerebri by caustics and pressure. Ligatures were applied to injured vessels. Nausea, vomiting, and hemorrhage from the ear were recognized as symptomatic of severe head injuries. Badly united fractures were rebroken. Hemorrhage was arrested by styptics.

Rolando, who practiced and taught at Bologna, has left an account of how he treated a case of hernia of the lung by dissecting back the skin margins of the wound and amputating the protruded tissue. The patient recovered, though he had been given up to die by the physicians of the city, and the wound was six days old, gangrenous, and full of worms when Rolando undertook it, after taking the precaution to get the sanction of the bishop and the assurance of the man's overlord and 30 prominent citizens that no harm should come to the operator whatever the result.

Bruno of Calabria, the friend of Petrarch, practiced both medicine and surgery, and wrote on these subjects, apparently having access to Greek and Arabic sources of information not generally known to his contemporaries. In his *Chirurgia Magna* he resents the attempt to separate surgery and medicine, quotes from a number of ancient authors, but displays considerable originality. (A son and grandson were able physicians after him.)

Ugo Borgognoni of Lucca was no great scholar and did not go in for authorship, and we consequently know little about him, but he may be regarded as the founder of surgery at Bologna. It appears that Hugh made a contract with the city of Bologna—the document

¹ Though in point of time belonging to the Middle Ages, Paul of Ægina is properly classed with the surgeons of antiquity as being the direct successor and last representative of their thought and practice. From his death in 690 A. D., if we except Albucasis of Cordova in the eleventh century, the history of surgery does not contain a single noteworthy name until we come at the close of the twelfth century to the two Salernitans—Roger of Palermo (of Salerno, according to some) and Rolando of Parma. Following them we have the Borgognonis, Ugo and Teodorico, and Bruno, Saliceto, and Lanfranchi. The two last named produced a brief enthusiasm for the subject with Mondeville and Guy de Chauliac in France, Yperman in Flanders, and John of Arderne in England as its exponents. This brings us to the end of the fourteenth century. Then for a hundred years surgery was a dead art outside of Italy, and even there it languished.



is extant—to reside there half a year, attend the poor without charge, accompany military expeditions, and give testimony in legal cases when required. He received a single lump sum of money in return. His services were required in several campaigns, and he was present at the siege of Damietta. He used as an anesthetic a mixture of opium, mandragora, henbane, lettuce, ivy, mulberry, sorrel, and hemlock boiled with a new sponge, which was subsequently dried. When occasion demanded the sponge could be dipped in hot water and held to the patient's nostrils to deaden sensitiveness to pain. Recovery from the anesthetic was obtained by inhalations of vinegar. (The author of the *Breviarium*—it is ascribed to Arnold of Villanova—says: “To produce sleep so profound that the patient may be cut and feel nothing, as though dead, follow the recipe tried out by Michael Scot. Take of opium, mandragora bark, and root of henbane equal parts; pound them up together and add water. When a man is to be cut or sewed up, dip a cloth in this mixture and apply it to forehead and nostrils. He will soon go to sleep so profoundly that you may do what you will.”) His treatment of wounds was simple and consisted of protection by cloths wrung out in wine. He was opposed to meddling medication.

His son or pupil, Teodorico Borgognoni (1205–1296), has a lasting place of honor in the annals of surgery, because he was among the first to deny that suppuration was a necessary feature of healing wounds as generally taught down to the nineteenth century. He was for the dry method of healing, and there is no mistaking his language about the theory of “laudable” or desirable pus. In Book II of his *Compendium of Surgery* he says: “For it is not a necessity—as Roger and Rolando have written and many of their pupils and nearly all modern surgeons maintain—that pus should develop in wounds. This is indeed the biggest possible error. Such an event is no other than interference with nature, prolongs the malady, and prevents a firm closure of the wound.”

Whether this Theodoric, member of a preaching order, was identical with the one who held the position of almoner to Innocent IV and became bishop of a diocese near Ravenna, has been disputed. Perhaps he practiced surgery as a young man and went in for ecclesiastical honors later. At any rate he was the most original of all the clerical practitioners of the early period in view of the passage given above, however, much he may have quoted from others as accused of doing by De Chauliac, who was a frank and rather universal critic.

When we read of how Theodoric used the Saracen ointment, a form of mercurial salve, for the “disease of the dead,” characterized by ulcers of arms and legs; for certain forms of chronic rheumatism

and the early stages of "leprosy," which it "cured," and note the directions to the patient to stand daily between two fires and rub his limbs until his teeth ached and salivation developed, it is hard not to think that he was treating syphilis whether he realized it or not.

One would like to know something of the life of this gifted and unusual thinker, but the only certain facts are that he took holy orders, practiced at Bologna, and amassed great wealth. His treatise on surgery challenged the opinions and practice of his day, and not only gave directions for treatment, but propounded a principle of pathology which makes him without a rival, except for his pupil Mondeville, down to the time when his views were established by Lord Lister.

As the champion of the rising medical school of Bologna he did not hesitate to attack the methods of Salerno. He claimed that it was his master, Ugo of Lucca, who performed the famous lung resection and that Rolando was present only in the capacity of a spectator. He told further of restoring to health a patient who came to him from Salerno after eight months of illness, due to a wound in the back from which matter ran out, identical with what he got rid of by coughing. The Salernitans pronounced the case phthisis and incurable. Theodoric soon cured the man and had him putting on fat. We see in these narratives the rivalry between the old conservative school, approaching its period of decay, and the rival one just entering on a career of phenomenal brilliancy.

. Guiglielmo Salicetti or Saliceto (1207-1277), a native of Piacenza, is generally held to be the greatest surgeon of the thirteenth century, though a physician and a priest. In his youth he accompanied troops in the field; later he practiced at Piacenza, Pavia, Cremona, and Bologna, teaching there for four years, and finally at Verona, where he was city physician. As a university graduate and a traveled man; as a surgeon of experience in both civil and military practice; as a judicious physician, frequenter of hospitals, patronized by the best class of patients and gladly serving the poor; as a writer, public official, and teacher we see in Saliceto the beau ideal of the versatile, accomplished, well-rounded physician. How free from prejudice and scruple he was may be judged by the honesty with which he recognized his son born out of wedlock, and by the way he operated with his own hands, despite the attitude of the church, even treating surgical affections of women and writing on that subject.

As specific evidences of his skill and judgment may be mentioned the reduction of a hip dislocation of a year's standing; the suggestion of thorough ablutions with water and vinegar as a venereal prophylactic; the emphasis laid on crepitus as a diagnostic point in fractures; the assignment of a venereal origin to chancres and buboes;

the suture of divided nerves; the description of the characteristics of arterial and venous hemorrhages; the free use of the knife instead of the cautery. The only blot on his escutcheon is his employment of salves and ointments in wounds for which at least the users of *bipp* will not condemn him. Greatest of all titles to distinction was his combining surgical and medical practice and regarding them as complementary to each other and equally founded on diagnosis. He wrote his surgery for his son whom he brought up to follow his profession. Besides these technical directions, there are others bearing on conduct and demeanor which illustrate his practical wisdom. The physician is cautioned not to wax too communicative with the ladies of the patient's household, and reminded that a minute and kindly concern for the welfare of the sick may outweigh instruments and drugs. He is credited with curing a case of dislocated vertebra and a perforating wound of the abdomen, and his comments on luxations and fractures are very judicious.

He tells of getting a big fee from a soldier wounded by an arrow which entered the neck, avoided the great vessels, and penetrated the tissues to the shoulder of the opposite side. William treated him and the man recovered and lived for many years. His treatment for hardening of the kidneys was eminently rational. Having made the diagnosis on the reduction of urine, discomfort in the loins, and dropsy, he ordered a weekly purge of rhubarb, a diet of milk flavored with honey or sugar, rice or oatmeal cooked in milk of almonds or goat's milk, and frequent drafts of barley water and honey or a decoction of mallow seeds and honey.

Lanfranchi, of Milan, the most highly esteemed of Saliceto's disciples, attained great distinction by the powerful impulse which he gave to surgery in France. He was a cleric who practiced both medicine and surgery. His residence in his native city was cut short by his lack of political foresight in espousing the wrong side in the fierce struggles of Guelph and Ghibelline, and he was exiled by Matteo Visconti. He lived first in Lyons, where he wrote the *Chirurgia Parva*. Later in Paris he brought out his *Chirurgia Magna*. He was most flatteringly received at the capital and his bedside clinics, his public operations, and his lectures attracted a large following, including not only clerics like himself, but the members of the recently organized Collège de St. Côme. The fact that Lanfranc had one and perhaps more than one son does not seem to have affected his standing in any way. Indeed, in Italy the celibacy of the priesthood was so constantly violated that Frederick II made special provisions whereby illegitimate offspring of the clergy could inherit property on the strength of simple public avowal by the parent.

Lanfranc, though himself very cautious in undertaking a radical operation and limiting the employment of the trephine to depressed

fractures and injured meninges, may be regarded as the father of reputable surgery in France which was almost nonexistent before his day. He strongly deprecated engaging in the minor manual details within the barber's province, but maintained that medicine and surgery could with propriety be done by one and the same man, since theoretical knowledge was indispensable to both branches of the profession. He seems to have been very well posted on head surgery and we may conjecture that the strife of Guelph and Ghibelline at home had given him a practical acquaintance with broken heads.

Lanfranc records saving the life of a 3-year-old child who fell with a knife in his hand and cut a vein in the neck. For more than an hour he controlled the hemorrhage by digital pressure, while an assistant went for a styptic, made of aloes, white of egg, frankincense, and hare's fur.

A boy of Milan stabbed another in the arm. The bleeding could not be stopped in the usual way, and Lanfranc proposed to isolate and tie the vessel, but the victim's mother objected and called in another man who promised a cure. Lanfranc withdrew. The boy continued to bleed and Lanfranc was asked to come back, but declined. A physician, who was a friend of the family, was now consulted and he confirmed the wisdom of what Lanfranc had advised and a surgeon was called in who twisted the vessel with his hands and tied it with a thread just as Lanfranc had planned to do.

Lanfranc aided by Mondeville and Jean Pitard was responsible for a brief but keen interest in surgery in France. Pitard's position as physician to Philip III enabled him to further the surgeon's interests not a little. The Brotherhood of St. Côme has honored him with the title of founded, but in order to do this had to compose for him a detailed and fanciful biography not according very well with existing documents. All that we know is that he was surgeon to the king (1306), official attendant at the Châtelet (1311), and at the head of the board of examiners for candidates for license in surgery. He left no writings to tell posterity what he thought and did and it is mainly from his association with the Milanese reformer—because Mondeville, who usually was very outspoken in condemning clerical surgeons, describes him as a man of worth; because of the reverence in which he was held by the College of St. Côme—that he has received any notice from historians. Lanfranc, though surpassing Saliceto in learning, was not his equal as a surgeon, for he never undertook the more serious operations and preferred cautery to knife.

Of the prevailing tendency, he said :

Why, in God's name, have we to-day such a separation between physician and surgeon! Physicians have abandoned operations to laymen either because they disdain, as some say, to work with their hands or rather, as I think, because they do not know how to do an operation. This abuse has finally

reached a point where common people consider it impossible for one and the same man to know both surgery and medicine. It must be realized, however, that one can not be an able physician without some idea of surgical operations, and that a surgeon ignorant of medicine is nothing at all, and lastly, that it is very necessary to know well each branch of medicine.

Henry of Mondeville (1260-1320), a native of Normandy, was a pupil of Lanfranc and of Theodoric, having studied at Paris and Bologna, as well as at Montpellier, and he was the instructor of De Chauliac, thus forming, as Withington says, the connecting "link between Italian and French surgery." He was a man of energy and determination, of caustic wit and forcible speech, combining simple religious faith and fervor with no little pessimism. He was the royal physician, lectured to medical students, attended patients at the Hôtel Dieu of Paris, and served in various military expeditions. These he complained of as interruptions. He died (probably of tuberculosis) before completing his treatise on surgery, and it was not published until 1892. It contains much of historical value and intense human interest, revealing the author as a courageous champion of his principles and at the same time one who neglected no step to collect his fee, having learned from bitter experience the ingratitude of patients. He and Pitard introduced Theodoric's wound treatment in the civil and military surgery of their day and were showered with abuse and actively persecuted for so doing. However, the favor of the King, of Charles of Valois, and of others in the army who had seen the results of their work, sustained their courage and prevented them from giving up the fight.

The following quotations illustrate Mondeville's shrewd spirit and his freedom from superstition: "It is very dangerous for a surgeon who is not in repute to operate in any way different to that in common use." He advises keeping up the patient's spirits by every possible expedient, "by music of viols and 10-stringed instruments," "or false letters may be written relating the death of his enemies or of those from whose demise he expects advantage. For example, if he is a canon of one or more churches tell him the bishop is dead and he is elected to succeed him." "When you are treating a wound or accident the friends and relatives should be put away, for they faint and create a disturbance; but sometimes a higher fee may be got from persons present fainting and breaking their heads against wood and the like than from the principal patient." "Never dine with a patient who has not paid you; it will be cheaper to get your dinner at the inn, for such feasts are deducted from the surgeon's fee." "I have never found anyone so rich or even so honest of any condition, religious or other, who was ready to pay what he had promised unless obliged and convicted." "Wounds do better before suppuration than after it." "There are more surgeons who can cause suppura-

tion than there are able to cure it." His method of treating a wound was to wash it, clean it, and leave it alone, a remarkable course to follow in the thirteenth century when medication was complicated and patients expected to be fussed over and were required to take draughts and drenches every hour of the day. How many times it must have been said of him that he did not "take an interest in his cases." We may believe, however, that he was proficient, judging by his use of styptics, digital compression, acupressure, torsion, and ligation for arrest of hemorrhage.

Mondeville's writings were probably slow in getting printed because of his fearless, biting sarcasm. What censor could rise superior to the implied taunt in the broad Christianity of the following: "If you have operated conscientiously on the rich for a proper fee and on the poor for love, you need not play the monk nor make pilgrimages for your soul."

If we are wounded by suggestions of craftiness in him and a great readiness to think of his fee, we should realize that Mondeville wrote with absolute candor about himself as about others, and doubtless there was irony in every word. As a leader without followers, a preacher whom none would heed, a piper who found none to dance to his tunes, he could not fail to be embittered. He saw in surgery merely a form of treatment, and the reputable healers of his day would have none of it. He was the apostle of union by first intention. Do not disturb the wound by meddling dressings. Clean it, cover it, and let it alone. If it does suppurate, clean it and start over again and so you may get a sweet-smelling wound and a thin scar. Such was his gospel. He was very clear on isolating the vessel before tying and boldly opposed the Galenical proposition that hemorrhage washed out inflammation. Mondeville said it only weakened the patient. For oozing he used styptics; but active hemorrhage demanded digital pressure for an hour. Like Lanfranc, he knew that the eschar from the cautery was liable to drop off and permit secondary hemorrhage.

Mondeville has presented a vivid picture of the unscrupulous methods of the physician in attempting to undermine the surgeon:

"Sir, it is plain that surgeons are proud and pompous, yet entirely devoid of logic and utterly ignorant; or if they know anything, they have learnt it from us physicians; they are also rough men and demand high fees. On the other hand you are weak, suffering, and delicate and have heavy expenses, so I advise you not to seek their counsel; and I, from regard to you, though I am not a surgeon, will try to help you without them." If the patient does not improve he tells him: "Sir, I told you at first that I was not a surgeon, but for the said reason and because I pitied you, I did what I did well, and according to art and logic, and better than any surgeon, God knows. But I am just now occupied in certain business which prevents me attending to you as usual, so I advise you to call in a surgeon." Then he contrives that a wretched, ignorant

surgeon shall be summoned and that for four reasons: (1) That he may be unable to discover the physician's mistakes; (2) that the physician may dominate over him, and continue surgeon as before; (3) that if necessary he may throw the blame of his errors past and future on the surgeon; and (4) that he may attribute all the honor to himself.

He also gives the other side and explains how the surgeon tells his patients that the physician does nothing but talk and distress them with purges.

Another pupil of Lanfranc was Jean Yperman (1295–1351) the great surgeon of his time in the Low Countries, a native probably of Ypres. Though known to have labored with great skill and from high motives his writings disappeared and were not recovered until 1818. While quoting frequently from the surgeons of his time he has little to say of the practitioners of medicine. He divides scrofulous patients into two classes, those who are touched by the king and those who are not, the former being again subdivided into those who get well and those who do not.

Guy de Chauliac is commonly considered the greatest surgeon of France before Paré, and he was a good practitioner, too. He was born in the quaint little town of Chauliac on the border of the mountainous province of Auvergne. He took orders at an early age and studied at Montpellier and probably also at Paris, Toulouse, and Bologna, acquiring his anatomy at the latter seat of learning from N. Bertuccio, a pupil of Mondino. He taught for a while at Montpellier and then settled in Lyons, living there until summoned to the papal court at Avignon where, during a period of 20 years, he was physician to three Popes in succession and served also as chaplain to the last one. He died at Avignon July 23, 1368.

Twice during his service at Avignon the city was visited by the plague which swept over Europe and carried off a fourth of the population. (Laura, the inspirer of Petrarch, lost her life from this malady.) In 1348 it first appeared in pneumonic form and after two months the bubonic type was the prevailing one. Toward the decline of the epidemic De Chauliac himself contracted the disease and in a truly scientific spirit analyzed his symptoms and later recorded them. He had stuck valiantly to his post, laboring for the welfare of the stricken people while other physicians departed in haste, though he admits, in all candor, that only a sense of shame prevented him from decamping too.

De Chauliac's great work, the *Inventory of the Art of Surgery*, shows him to have been a clear thinker and far ahead of his contemporaries in learning. He wrote simply and pointedly, as one sure of his ground and not groping in the darkness of conjecture. He revived the best practices of the ancients, yet did not follow them slavishly. For at least two centuries the *Inventory* was a standard

textbook of surgery in Europe passing through many editions. Not only did he lay down rules of practice, but in a few simple words summarized the moral duties of the physician in a manner worthy of Hippocrates himself. He must be gracious to the sick, generous, and compassionate; wise in prediction, chaste, sober, full of mercy, not covetous nor extortionate; content with moderate fees, proportioned to the circumstances of his patients and the nature of the case, yet compatible with his own dignity.

De Chauliac divided practitioners of surgery into five classes: (1) Those who believed in encouraging suppuration; (2) those who used a preliminary washing with wine and then tried to keep wounds dry; (3) those who trimmed the edges and applied salves; (4) those who used oils, charms, and cabbage leaves, who saw God in words, grasses, and stones; (5) those women and fools who folded their hands and accepted what came as the judgment of God.

In his practice De Chauliac was not free from gross errors. His operation for hernia included castration, and he used salves and plasters for wounds. On the other hand he suspended fractures by slings on weights and pulleys, advocated prompt resort to the knife in malignant disease, and seems to have been the first man to think of suspending a rope over a patient's bed to help him move himself about. His treatment of chronic ulcers consisted in washing them with alum water, applying a thin sheet of lead, and bandaging. He calls God to witness how often he achieved success by this method. De Chauliac freely admits his dependence on classic authorities but modestly supplements them with his own opinions. He lays great stress on the importance of a broad education as a foundation for medicine. Without this the profession will be invaded by artisans who will cheerfully abandon their tanneries and carpenter shops to play the doctor. The influence of such a scholar, of such a high-principled man did much to bring surgery into repute. De Chauliac as a man and practitioner was worthy of all praise, but as a leader, as a shaper of thought, he was worse than a failure, for he caused the contemporaries and successors who believed in him to turn a deaf ear to Theodoric and Mondeville, who, like men crying in the wilderness, sought to introduce asepsis six centuries before its time.

The surgeons of the thirteenth and fourteenth centuries were far more conservative in the use of the trephine than the Greeks were or the Arabians professed to be, and usually delayed for four or five days after an injury trying to build up the patient and cure him by medicinal applications unless the indications were very pronounced. Both Lanfranc and Guy de Chauliac employed the instrument only when depressed fractures or cranial perforations were manifest. In the case of penetrating wounds of the chest, Bruno, Rolando, Roger, Saliceto, and Lanfranc kept them open so that retained matter might

not attack the heart or other important organs. Theodoric and Mondeville on the contrary closed them promptly to retain heat and the vital spirits. Guy de Chauliac closed them when there was no accumulation of fluids and left them open if there was.

While Guy declined to operate for stone, he did undertake the cure of hernia and the resection of ribs, preferring the knife to the cautery in empyema. Scholar that he was, he asserted that the surgeon should not relegate minor operations to a barber, but put on leeches, cup, bleed, and pull teeth himself. We must recognize De Chauliac as one of the most remarkable men the profession ever produced in that he combined diverse characteristics ordinarily not found in the same individual and least of all at the time in which he lived. What indeed could be so antipodal as the deeply marked habits of study, the great store of book learning and his practical sense, his clinical faculty, and his courage in surgery. Here was a man who had the best private library of his period and never journeyed without taking along scissors, pincers, probe, lancet, razor, and needles, and five special salves with which to ripen or mature, to alter, to consolidate, to redden, and to soften.

Peter of Argelata is an example of the cultivated and accomplished Italian surgeon able to hold his own with the lordliest of physicians. He was born at the close of the fourteenth century, studied under Guy de Chauliac, attained a doctorate of arts and of medicine, and held a professorship at Bologna. He died in 1423. It is interesting to compare him with his master in two respects. When assigned to embalm the body of Alexander V he performed the task with his own hands. Guy, having a similar duty to perform on another Pope, turned the job over to James the apothecary. Guy, in attendance on an obstetric case, gave orders to the midwife. Peter did what was needed himself. To remove the dead fetus he dilated the cervix with the aid of a speculum, introduced his hand into the uterus, used hooks or forceps, or, perforating the cranium, hooked his finger into the cavity and used it as a tractor. He operated for stone and rupture, incised fistulae, trephined both the long bones and the skull, kept his wounds dry with dusting powders, drained them with metal tubes or sewed them up, according to the necessities of the case.

Little is known of the life of Leonardo Bertapaglia except that he belonged to the school of Padua and was taught surgery by a man who had written a lost work on fractures of the skull; that he attended one or two dissections, and exercised his art in Venice. He appears to have combined courage with prudence, for not only does he lay stress on the importance of good teachers and of seeing others operate before attempting it, but speaks with feeling of the seriousness of undertaking the removal of scrofulous and cancerous tumors.

These tumors are intricately connected with blood vessels and require the most careful dissection, which, unless thorough, accomplishes no useful purpose. He describes the technique of rib resection and three types of bone saw. In suturing the intestine he employed no tube of any kind but a simple glover's stitch of catgut, and expresses the opinion that longitudinal wounds of the gut might heal but that the transverse ones were fatal. To prevent the slipping of a ligature the vessel must be carefully isolated and lifted into view, and, after tying, the needle should transfix the vessel and then be wound around it several times. He treated varicose ulcers by ligating the veins of the region, and declares that one can not but be astonished at the prompt and satisfactory cure thus accomplished.

Historians seem to differ widely as to the merit of Marcellus Cumanus, a surgeon in the employ of the Venetian Republic, who voyaged in the Levant, and saw military service at the time of the famous invasion of Italy by Charles VIII. He had a single formula for all wounds, whether they were caused by arrows or fire-arms. It consisted of oil of roses, galbanum, and asafetida in oil, used hot.

Antonio Guainerio, a physician of Pavia, was appointed to a professorship in the university of that city in 1412. His professedly surgical treatises on diseases of the womb and of the joints contain only medical advice, but the essay on calculi has specific directions for intervention in cases where the stone is impacted in the urethra. Various movements are to be tried in the hope that the stone will drop into the bladder. If these fail it is necessary to dislodge the stone and push it back by means of a bougie of wax, tin, or silver. He speaks as if these bougies were generally known and employed.

A very remarkable man indeed, if we may accept Malgaigne's estimate of him, was Giovanni Arcolano of the fifteenth century, who, after teaching logic and moral philosophy, held the chairs of medicine and surgery at several of the Italian universities. His *Practica*, printed in Venice in 1483, throws a valuable light on the methods in vogue in his day. He describes in detail the different ways of removing a foreign body from the eye. For example, the surgeon could take in his mouth a detergent liquid and squirt it into the eye. Or he could go after it with a probe dipped in resin or glue, the eyelid, of course, being everted. By holding the patient's nose and mouth till he wept the tears would wash out the foreign body. Finally, a piece of amber rubbed on a cloth could be used as a magnet. His entropion operation is given with much minuteness. Most ingenious of all his suggestions is that for removing foreign bodies from the external ear by suction. The primitive syringe made of a bladder with attached nozzle is the instru-

ment. Cut off one end of the bladder, and insert three rings of proper size to distend the walls, placing them parallel and a small space apart. The cut end of the bladder is now tied. The bladder is made to collapse by pressure, and the nozzle then introduced into the aural canal. If the rings are now forced apart so as to distend the bladder there will be aspiration through the nozzle. Three types of hernia truss are described. Taxis is to be done with the patient in the dorsal decubitus, the legs and thighs flexed on the abdomen and abducted.

Arcolano tapped hydrocele of the tunica vaginalis and then cauterized with arsenic. He discusses the pathology of urethral stricture and treatment by sounds of leather (reduced to the softness of paper), silver, wood, brass, or copper. Failing of success by these instruments the bladder is to be drained by an incision at its neck. In repairing a torn intestine he used the glover's stitch and surrounded the area involved with a section of intestine from some animal. He recommends that cavities in teeth be filled with gold.

Giovanni Matteo Ferrari de Gradi, a native of Milan, who died at Pavia in 1472, was professor in the last-named city and enjoyed so brilliant a reputation that patients of rank and wealth came to consult him from the remotest parts of Italy, from France, Switzerland, and Germany. He left his fortune to build a hospital and his house was to be used as a residence for students of medicine, canon law, and theology. While his writings are in the main devoted to after treatment and hygienic directions, they inform us that he used solid pessaries of wool soaked in wax impregnated with astringents. He required that the pads for trusses should be flat and not spherical, since the latter form was calculated to enlarge the hernial orifice. His advice to the Marchesa Malaspina, who was very anxious to bear a child, proves that he was well acquainted with the vagaries of sex and knew a good deal that does not usually get into the books (Malgaigne feels it necessary to quote the original Latin text), but the strictly medical injunctions would probably prove as ineffectual as they would be difficult to carry out.

His successor at Pavia was Marco Gatinaris, a native of Vercelli, who died in 1496. He popularized the enema syringe. He is one of the first writers to report a case of umbilical hernia following labor. He states that in children rupture will frequently be cured by the wearing of a simple bandage. He affirms that along with moles may develop certain things not according to nature, and cites the case of a woman who, after 12 months of supposed pregnancy, gave birth to a large, fleshy mass and numerous small pieces, and, in addition, to an animal with movements like a hedgehog which had a dark green back and a red belly, and was so thick-skinned

that it could with difficulty be cut with a knife. One wonders whether along with the hydatidiform mole the woman begot some *lusus naturae* or the play was entirely in the observer's imagination.

According to Alessandro Benedetti, of Padua (1460–1525), who wrote on diagnosis, it was a Spanish surgeon who first definitely established an operation for hernia without the detestable but generally employed detail of castration. The method consisted in reduction by posture and taxis. While by pressure one hand prevented the contents of the sac from redescending, the other was used to pass a strong ligature of raw silk through all the tissues except the carefully separated cord, just below the original site of the protrusion. A small bone plate, 1 inch in width, was now applied to the skin, and the ligature tied tightly over it. Once or twice a day torsion was applied to the plate so as to tighten the ligature until it cut its way out, the idea being to produce a scar to obliterate the sac on either side of the seton.

Bartholomew Senarega, a historical writer of Genoa, published in 1510 an account of the performance of a Spanish surgeon who in doing a lateral lithotomy used a metal guide in the urethra and a finger in the rectum to locate the stone and facilitate the incision, the extraction being effected by means of a hook.

The Brancas, father and son, of Catania in Sicily, were described by the admiring Bishop of Lucera in his *Annals of the World* (1442) as the greatest surgeons on earth, because they replaced lost noses. Judicial punishments, fighting, and syphilis destroyed a great many noses in the old days. The elder Branca derived his flaps exclusively from the face, but his son used tissue from the arm, leaving a pedicle attached until growth at the new site was well assured. The younger Branca appears to have done other plastic work about the face, such as curing harelip and improving or replacing defects of the lips and ears. It is usually supposed that these men had in some way secured a copy of Celsus. From Catania the art of rhinoplasty passed to the Italian continent and was practiced by other families such as the Vianos or Boianos. All practiced in the open and did good work destined to be improved by Tagliacozzi in the sixteenth century. Other well-known families similarly employed were the Rouzanos and Pavonis.

Very different were the Norsini, of Umbria, who enjoyed great popularity as lithotomists and herniotomists but included castration in their technique for the latter operation. Fabricius of Aquapendente, mentions a certain Orazio of Norsia, in Umbria who was extremely skilled in the radical cure of rupture and did as many as 200 in one year. Members of this Norsini family continued to operate in this way up to the middle of the seventeenth century.

It can not be said that England, during the period strictly included in the Middle Ages, produced any truly great men. Gilbertus Anglicus was an able and educated practitioner of sufficient renown to have a street named after him in the part of old Paris frequented by medical students, but he was in no sense a surgeon, though he adverts in his *Compend of Medicine* to the surgical practices of Roger and Roland. For the most part the best operators in England were the barbers, a well-informed and reliable lot.

John of Arderne (born 1307) has been called the Father of English Surgery. He practiced first in Newark and then in London, after studying at Montpellier and serving on the Continent from Spain to Flanders. He was an educated man, though a surgeon, and belonged to the Guild of Surgeons, at that time distinct from the Guild of Barbers. The ego looms large in his writings, which not only describe him as the inventor of wonderful instruments and the possessor of important secrets, but, alas, betray him as a believer in charms. But he had some of the essential qualities of a good surgeon. He was fearless and he had common sense. He told patients frankly what he thought, whether they liked it or not. If he used the knife he used it until he had accomplished his purpose, unafraid of the sight of blood. He struggled to have clean wounds and did not believe in dressing them too often. If a wound seemed to be doing well and there was evidence that the patient's general condition was improving, he dared to let the dressing go unchanged for three days instead of dressing it three times in one day, as his timorous colleagues did. He held that the leech should have clean hands and nails well shaped and free from blackness. He outlines the proper character and conduct of a true surgeon, urging the importance of virtue and sobriety and a guarded tongue in his relations with other practitioners. He declares it prudent to agree upon and collect a fee at the outset, but not to vouchsafe an opinion in advance of seeing the patient.

He acquired skill with the knife during his service with the army in France in the Hundred Years War. His method of treating fistula in ano is described in full in his *Practica*, and there is certainly nothing of Arabic or pedantic medical school about it. He cut in boldly from without and followed each ramification to the bottom with the knife instead of wasting time with probes and cauteries. His after treatment was simple and nonirritating. The manuscript of the *Practica* is in the library of St. John's College, Oxford. It abounds in personal observations and illustrations and descriptions of instruments. From it we get a definite contemporary account of the well-known incident of how the ostrich-feather crest of the Prince of Wales was acquired at the Battle of Crecy. We learn, too, that

the knight at arms of the period was much subject, from long hours in the saddle under the weight of heavy armor, to constipation, ischiorectal abscess, and fistula in ano.

Worthy successors of Arderne were Thomas Morestide and William Bredewardyn, who came into prominence early in the fifteenth century, at the time of Henry the Fifth's campaign to recover Normandy. They were assigned the difficult task of securing surgeons and instrument makers of ability and repute to accompany the expedition. Morestide was its chief surgeon and the personal attendant of the King, whose predecessor and successor he served in a like capacity.

Fynes Moryson (1566-1630) a scholar of Peterborough, Cambridge, spent seven years traveling on the Continent of Europe collecting material for a sociological survey to serve as a thesis by which he hoped to receive the degree of A. M. from Oxford. We cull from his "Itinerary" the following note:

"The Universities of Sienna and Salernam of old, and espetically of Padoa as well of old as to this day, haue yealded famous Phisitians, who in Italy are also Shirgians and many of them growe rich, for all that haue any small meanes, will in sickness haue their helpe, because they are not prowde but will looke upon any ordure and handle any sore, but espetically because they are carefull for their Patients, visite them dilligently, and take little fees which make heauy purses. They visite twise each day the poorest Patient, and not only in Italy but also in Germany and Fraunce, they expect no greater fee than the value of eightyne pence English for a visite. Only the Italyans and French take ready monye, whereas the Germans are not payde untill the ende of the sickness, when if the party be dead they haue nothinge, if he recover they are payde after that rate, and will refuse more if it be offered them. The Italyans as well as the Germans carefully visite the Apothecaryes shops, and burne all druggs that are not sounde. But Italy hath a generation of Emperiks, who frequently and by swarmes goe from Citty to Citty, and haunt their Markett places. They are called Montibanchi of mounting banches or litle scaffolds and also Clarletani¹ of prating."

¹ Clarle—idle talk, gossip, etc.

EDITORIAL.

CALLING A SPADE AN IMPLEMENT OF HORTICULTURAL UTILITY.

Somebody has invented a euphemism for venereal disease—the “great red plague”—and just as the American public has been almost educated to the point of attacking a really vital problem in earnest, laying aside mock modesty, mawkish sentimentality, and some of the qualities ascribed to the ostrich, behold a step backward in this needless camouflage. So long as a man is ashamed of his job no great excellence will he develop in attending to it. We do not rob death of its horrors by calling a coffin a casket and making it of mahogany and adding silver handles. “Syphilis may be conveyed by kissing” is plain English as soon as we have taught people what syphilis means. What will we gain by saying the “great red plague is liable to dissemination by osculation”? A change on one side of the equation calls for a corresponding change on the other; if we multiply or divide the numerator we must similarly treat the denominator. Having decided to wear a mask in the designation we must don motley for the exposition. To adopt a polite parlor term for a vile thing calls for kid gloves in handling it. When we say venereal disease we are almost intelligible. If the hearer is too ignorant to connect this word with Venus and the idea of libidinous indulgence there remains the dictionary.

Plague is overworked now. We have bubonic plague, pestis magna, the plagues of Egypt, the great white plague; but there are a few unappropriated plagues still in stock, and we urge the public to get in its orders early. Constipation is a vulgar word far too generally understood. Call it *Pestis Feminarum*. Alcoholism is *Yesterday's Plague*. More cryptic still would be *Pestis Oculorum Rubescentium*. Arson could be *Pestis Hebraica*. Call infanticide *Pestis Herodiana*. For socialism let us say *The-Put-Your-Hand-in-the-Other-Fellow's-Wallet Plague* or *Pestis Invidiosa*. Graft is such a horrible thing that we really must have a nice synonym for it—say *Pestis Latronum*. Meeting an arch knave in society one could gratify a sneaking contempt for his calling by a cheerful “Hello, Latty!” which it would take him a while to interpret. Nothing like being “real polite.”

"TO RIDE THE HOBBY HORSE WITH THE BOYS." MONTAIGNE.

We would deem that man a paltry and craven fellow who needed to have some one pick out a hobby for him; whose spirit did not turn promptly and naturally for recreation in some definite direction once the door opened and released him from the cage wherein habit and the daily duty has held him "cabin'd, cribbed, confined." Few of us but have or have had some natural bent, taste, interest, predilection which would incline us to a particular steed if we could get as far as the stable. The trouble is that we do not recognize the necessity for riding a hobby; the huge benefit such exercise confers; the renewed vigor, enthusiasm, freshness with which we return to our ordinary avocations on dismounting.

As a nation we are not sufficiently alive to the value of hobbies and are the poorer on that account. In the frenzied struggle for achievement we repress the instinct for play. We take ourselves too seriously or we would know that the sane, sound man is but the well-matured child and must still have his toy after donning the toga nor need he hide it thereunder. The girl who never cared for dolls may master the art of luring men, but I doubt she will ever become the full-bosomed matron deserving well of the republic. The boy who never played soldier or Indian, who longed not consumingly for red-top boots, for whom the swimming hole and the snow fight had no insidious fascination, will likely develop into a weird and peculiar creature incapable of greatness except in some narrow by-path of life.

The hobby is not the fad, nor the strictly utilitarian employment of leisure hours. We do not go to the circus or the barnyard when we want a horse for a canter. Golf, tennis, philanthropy are not in the domain of hobbies. The true hobby is a pursuit in the literal sense of the word. It takes the rider's mind away at a gallop from the ordinary path of plodding through pain or pleasure to where he forgets wife and child, business and profit, responsibility, duty, immortality, eternity—even himself. Like Curl he may go in for art, or like Richards for ornithology.¹ He may tinker with gears and carbureters like Murphy, a great inventor manqué, who is never so happy as when he has taken his eight-cylinder car apart and put it together again, or be a philatelist like Lowndes and Blackwood and McCullough, who have valuable collections.

Your true hobby is the opposite of that repression about which the psychiatrists have so much to tell us in these latter days. We would have fewer cults of the inane, fewer worshipers of foolish fetiches,

¹ Capt. T. W. Richards, Medical Corps, United States Navy, has contributed many specimens of birds and some 12,000 birds' eggs to the collections of the Smithsonian Institution, Washington, D. C.

fewer scatter-brained reformers, fewer people passionately addicted to meddling in the affairs of other people, if there were more riders of hobbies, hobbies sound of wind and stout of limb. With more collectors of curios in Wall Street the stock exchange would not yield so many suicides, so many cases of cerebral hemorrhage. Hobbies should be as compulsory for all mankind as physical exercises are for naval officers.

Microscopy owes much to the clergymen of England who devoted themselves to diatoms as a rest from the dogma of damnation. Holland was never so great at home and abroad as when it took tulips seriously. By no schooling or art could "the last of the Capets" have been taught to govern France well. He inherited the revolution and the guillotine but his passion for making locks at least brought him happiness till the knife fell. Victor Emanuel, as a numismatist, can forget the menace of the red flag, the perennial rumbling of earthquakes. The Prince of Monaco need not vex his soul over the pettiness of his dominions above sea level for is not all the expanse of the vasty deep his to explore for what "the dark unfathomed caves of ocean bear"?

Are you surfeited with wealth and must you hire clerks by the score to calculate your income tax? Become a collector of Persian rugs, of poison rings, of snuff boxes, or teapots. For such pastimes you need not be a fire worshiper, a machinator of Machiavellian plots, a user of sternutatories, nor a patron of Sir Thomas Lipton. Are you poor and needy? You will only be at expense for shoe leather as you tramp after butterflies, bugs, and beetles or burrow for arrow heads. Build shelves and cabinets for your *trouvailles*. Sort, classify, and label them. Breed bees in your own back yard. Gold fishes have an extensive literature all their own and the smaller the bit of wafer you feed them from Sunday to Sunday the better they will thrive.

No class of men needs a hobby as badly as do the doctors. From your patients with their pettishness, their selfishness, their exactions, their tyrannies, their whims, megrims, prejudices, and prevarications; from the persecutions of their pestiferous friends and relations; from the envy and malice of colleagues; from the book agent; from the exploiter of stocks and gold mines; from the compounder of pills and potions; from the promoter of patent appliances; above all from yourself—your conceit, your dogmatism, your exhausting efforts at affability, your simulated sympathy, your pretended devotion, your unflagging good nature, your concern for fees, your relish for approbation and applause, you must have respite. You must have rest from the gaunt and haggard countenance of the sick and the haunting appeal of his hollow eyes, his mute reproach, his agony of doubt;

from his pain and your powerlessness. You must get out of earshot of moans and groans and leave the scenes of horror and death. If you are to bear your burdens worthily make it a practice to lay aside the yoke each day and go a-maying in "fresh woods and pastures new." Without such relief your devotion will pay the penalty of frayed and broken heartstrings or of a soul obtunded and callous.

A hobby you will have in spite of everything. Woe betide the man whose hobby is part and parcel of his profession. Such a one is damned and thrice damned. His road leads deeper and deeper into the darkness of misguided arrogance. Let it once be suspected that you ride a medical hobby and then whatever the merits of your steed as to gait or color his rider is reckoned a crank. Should it be discovered that you do not believe in drugs or that you hold a particular remedy to have sovereign power for all diseases; should it be bruited about that you regard some special symptom as of unfailing prognostic import you will find your favor with the public assuming an inverse ratio to the strength of your convictions. It is valuable to be esteemed up to date, but damaging to be considered an experimenter. For one who rejoices in your advanced views on the endocrines there will be a hundred to dub you a dangerous visionary. The man who laughs at the transplantation of simian glands, when well, will make a wry face and declare he wants no veterinary in attendance, once he gets sick. To study anthropology and comparative anatomy is to have people say that you are a gross materialist and view your patients as mere animals. The geologist's hammer will not overweight your saddle bags but beware how you dispose specimens of palæontology about the office. There is a lurking danger for you in the word fossil. Even to be a collector of cartoons is not without peril. He to whom men and women confess the sins of the body dread the lover of incongruities, the gatherer of grotesques, the ferreter out of human foibles. Photography is a useful hobby. Once in a while you may even harness this animal in the shafts of your buggy; but in the main you will be wise to go far afield. Prefer roses, chrysanthemums, manuscripts, mezzotints, autographs, Japanese prints, incunabula, postage stamps, posters.

There is a single exception. To go in for the study of medical history is to polish and round off your knowledge. By no other line of research can you so easily acquire a sense of proportion. To the young it serves as a counterpoise to natural enthusiasm and overconfidence. A knowledge of the errors of the past will make you humble, liberal tolerant, circumspect; cautious in embracing radical innovations; slow to discard the good. If middle life or declining years find you still unprovided with a hobby choose this one above all others. Age turns naturally to the past. It is pleasanter to follow the great deeds of others than to contemplate one's own failures. As hopes

decay and the future holds more and more of uncertainty and gloom you will find consolation in reviewing the rise and fall of systems, in seeking the key to this man's error, in learning how that one just missed the immortality of success.

See the pretty hobbies, gentlemen, at your service; good hobbies all of them. Choose according to your fancy but have a thought to your figures and match your length of limb to the horse's girth. The roan, the brown, the black, the bay, the chestnut, the piebald, the skewbald, the sorrel, the flea-bitten white and the gray! There they stand with rolling eyes, tails switching, ears moving incessantly. There's mares and geldings; there's the flowing mane and the hogged one, the long tail and the bobbed one. There is one that can canter and caracole, can amble and do the piaffello and Spanish trot. Yon little short-coupled fellow is a stayer. The long rangy one will give you an easy ride. Here's a beast stands 16 hands in his four white stockings; look at the hocks on him, and the rump. He'll take you over timber and not flinch at the water jump if you've got the heart for it. Have you a mind to make a show in the park? Here's one with a bit of knee action will fret himself into a lather and make a mightier commotion going once around the bridle path than the weedy thoroughbred at his side in clipping the daisies over a mile of turf. Take your pick, gentlemen, and ride whither and how you will. Only get quickly into the saddle. There's no Hobson's choice in the lot of them.

HOBBIES OF GREAT PHYSICIANS.

Auenbrugger	Music.
Bell, Charles	Art.
Bell, John	Art.
Boerhaave	Music.
Bright	Art : collecting engravings.
Astley Cooper	Courtesy.
Hodgkin	Philanthropy.
Holmes	Literature.
Jenner	Birds and music.
Laënnec	Horseback riding ; music.
Murchison	Geology.
Osler	History of medicine.
Parkinson	Politics.
Young	Horseback riding, dancing, Egyptology.

SUGGESTED DEVICES.

RETINOSCOPIC LENS-HOLDER.

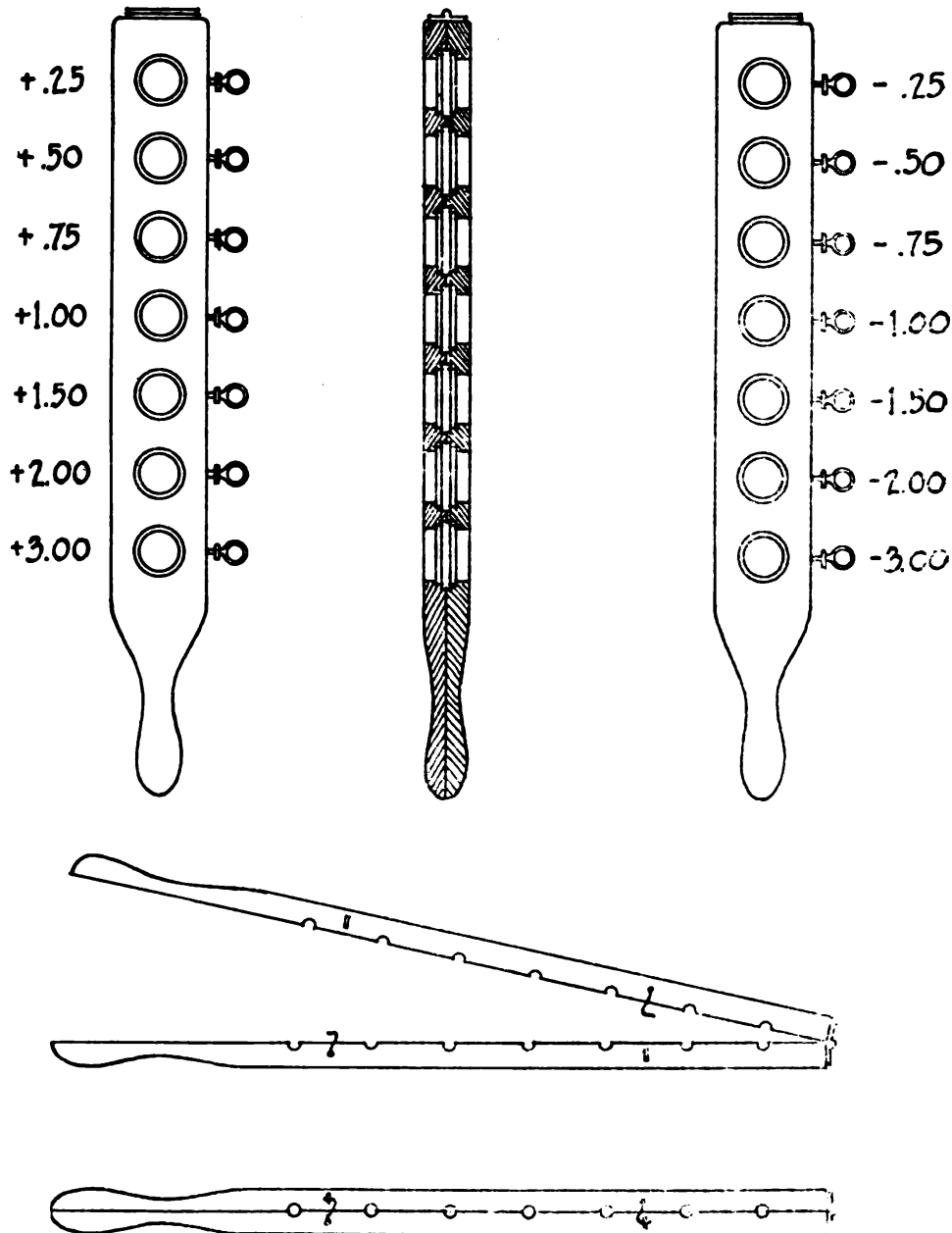
By J. S. TAYLOR, Captain, Medical Corps, United States Navy.

The ship's carpenter on the U. S. S. *Mississippi* constructed for me a lens holder which I found very convenient for use when neutralizing



the movement of the reflex in the dark room. It consisted of two long narrow strips of wood, containing a number of circular perfora-

tions each with a beveled rim on one face, of the proper size to permit trial lenses to rest in them snugly. The two strips were tapered so as to form when coapted a handle at one end and were hinged together at the other. Lay the lenses desired, say from -0.25 to -2 or -3 ,



in the bevel of one strip; bring down the other and clamp with the little hooks provided at the side. The patient holds the device before the eye under examination and moves it up or down as directed. There can be a holder for plus and one for minus lenses. It would

be best to have two holders for plus and two for minus lenses each holding about five lenses. If the holders are too long the patient does not hold them steadily. The plus and minus holders should be painted white and black respectively to facilitate distinguishing them.

The only originality claimed in this matter consisted in having the holders made for nothing aboard ship instead of purchasing them on requisition, at a fancy price, ashore.

STRONG ROOM FOR ALCOHOL AND NARCOTICS.

By A. FARENHOLT, Captain, Medical Corps, United States Navy.

The strong room previously used for this purpose at the United States Naval Hospital, Mare Island, Calif., was made of heavy boards on two sides and brick walls on the others. The door was of 3-inch material and the hardware the strongest possible. This room was situated in the basement and was located within another room which opened on the basement corridor. In spite of these precautions so many attempts to gain access to the stores just missed being successful that more adequate measures seemed indicated. The floor being of cement, a reinforced cement box room, 15 by 8 feet, floor measurement, and 6½ feet high, having a ceiling of the same material, was built on the location of the former strong room. The walls and ceiling are of 6-inch material, heavily reinforced with iron rods and iron mesh.

The ceiling has three rectangular openings 8 by 10 inches, covered by perforated ¼-inch iron plates set into the cement to permit escape of fumes. Electric wires enter by conduit pipe. The door is made of ¼-inch steel, in size 3 feet by 6 feet, having a few perforated small holes at bottom. The hinges are held by bolts which drift through the wall and are set up on plates on the inside. The door casing is a single piece of 6-inch channel iron. The lock was arranged by removing the door of a small safe and welding it securely to the inside of the steel door in such a manner that the door handle and combination are freely worked from the outside in the space cut away over these parts. The safe bolts on left, or opening side, engage in corresponding holes made in the channel iron door casing. The upper and lower bolts are lengthened in order to permit their engaging holes, made in top and bottom of the door casing. The room thus made practically forms a concrete vault having a steel door possessing the security of an expensive safe.

The iron and welding work was done in the local yard at a cost of about \$95, and all other work was performed by hospital labor with our own materials and in one week's time.

DETECTION OF MOSQUITO LARVAE.

By J. C. PARHAM, Lieutenant Commander, Medical Corps, United States Navy.

In Bulletin No. 98, Notes on Preventive Medicine for Medical Officers, United States Navy, a publication of the British War Office is abstracted. In this mention is made of the use of a ladle in searching for mosquito larvae. This measure has been employed with great success at this post; its use is enhanced by another simple device that has been of even more value in detecting larvae. This I have not seen described. It is a small hand mirror, such as may be purchased for 15 cents at any canteen. It is used in searching for larvae in rain barrels, cisterns, etc., as well as along edges of pools and in water-saturated grass lands. In using a mirror it will be found that by reflecting the sunlight on the surface of water in cisterns or any other container larvae are immediately "spotted," whether at the surface or whether they have sought safety in the depths. In this way the search for larvae is greatly expedited and it will be found that one inspector equipped with mirror and ladle can cover territory that would require four inspectors not so equipped. Of course the mirror is valueless when the sun is obscured.

CLINICAL NOTES.

A CASE OF TUBERCULOUS MENINGITIS SIMULATING LETHARGIC ENCEPHALITIS.

By W. A. BLOEDORN, Lieutenant Commander, Medical Corps, United States Navy.

In 1917 there occurred in Vienna an outbreak of a disease which was studied by Von Economo, and to which he gave the name "encephalitis lethargica." The disease was characterized clinically by lethargy, palsies of the cranial nerves, particularly the third and seventh, and frequently an increase in the cell count of the spinal fluid. The symptoms of this disease were multiple and frequently differed greatly in various cases. They were shown to be caused by an inflammation of the brain, and sometimes of the spinal cord, and even at times involving the meninges and peripheral nerves.

This disease made its appearance in France, Great Britain, and the United States, and it appears to have been pandemic during 1918-20. Having been recognized as a distinct disease entity with a definite pathology and a fairly distinctive symptom-complex, it attracted wide attention. While attention was focused upon it there was a tendency to class certain cases, which in many respects conformed clinically to lethargic encephalitis, and in which no definite proof of other disease entity could be demonstrated, as lethargic encephalitis. The two diseases which, perhaps, may simulate lethargic encephalitis most closely are tuberculous meningitis and acute anterior poliomyelitis. While it is true that the usual case presents a symptom-complex which is unmistakable, nevertheless there are cases of the above diseases in which only a post-mortem can definitely decide the diagnosis.

In tuberculous meningitis the phenomena of meningeal irritation are present, whereas in encephalitis lethargica they are usually absent. However, in a small percentage of cases of encephalitis lethargica definite signs of a meningitis are present and in tuberculous meningitis there may be also evidence of an encephalitis, usually superficial however, and readily distinguishable from the characteristic finding in encephalitis lethargica.

The following case of tuberculous meningitis is reported, chiefly because of its resemblance in many respects to encephalitis lethargica and also on account of the complete post-mortem report of the brain.

The case was in a male, aged 20, single, student, referred to hospital with the diagnosis of acute bronchitis.

Complaint.—Slight cough, drowsiness, general malaise.

Anamnesis.—Health has been good up to present illness except for an attack of influenza a year ago, from which he made a good recovery; mild case, no complications.

Family history practically negative.

About one week before admission to hospital, patient had been feeling listless and drowsy; appetite poor; slight cough; unable to concentrate on his studies.

Physical examination.—Upon admission, temperature 100 F.; pulse, 74; respiration, 22. Examination negative except for scattered moist râles in both lungs, more marked at right base.

Clinical course.—Patient continued apathetic and listless and slept most of the time. When aroused and questioned, he stated that he felt well and had no pain, and he usually went to sleep very quickly. During this period urine examinations were negative and blood examination showed white cells 8,200, with the differential count showing a moderate relative increase in polymorphonuclears. Blood cultures made at intervals during the course of the disease were negative.

On the fourth day following admission there was a noticeable change in the patient's condition. He became mildly delirious and showed some twitching of muscles of face, upper extremities and right abdomen, and at times complained of headache. Examination showed slight rigidity of muscles of post-cervical region with a suggestion of Kernig's sign on the right side. No ocular signs and no cranial nerve involvement were present; temperature, 100.4 F.; pulse, 88; respiration, 20. Spinal puncture at this time showed fluid under increased pressure; 20 c.c. withdrawn before rate of flow appeared normal. Smears from centrifugal fluid showed no microorganisms, cultures negative, cell count 16, small round cells predominated; globulin plus. White cells were 12,000, polymorphonuclears 84 per cent.

The following day the patient appeared somewhat improved. There was no headache and the rigidity of the neck had almost disappeared. He presented a more normal mental condition and stated that he had no pain or discomfort. There was still a suggestion of Kernig's sign on the right side, and no cranial nerve involvement.

On the seventh day of the disease his condition remained practically unchanged. White blood cells 7,200, polymorphonuclears 76 per cent, lymphocytes 16 per cent, large mononuclears 3 per cent, transitionals 3 per cent, eosinophiles 1 per cent.

On the eighth day the white-cell count was 8,200. Twitching of the muscles of right arm and leg were noticeable while the patient dozed, but disappeared when he was aroused. The tendency to

lethargy and somnolence was still marked and the feeling of well-being was quite noticeable in spite of the temperature and other evidence of an infectious process. No change in reflexes and no cranial nerve involvement at this time.

On the twelfth day the temperature was 101.5 F.; pulse, 90; respiration, 22. Uvula pulls slightly to the right; positive Kernig and Oppenheim right side; knee jerks active; no pupillary change; eye grounds negative. Spinal puncture and 35 c. c. clear fluid withdrawn; increased pressure; cell count 124, mostly small round cells; globulin plus. No organisms found on staining centrifuged specimen; cultures negative. Guinea pigs and white mice inoculated with sediment from centrifuged specimen.

On the thirteenth day, following the spinal puncture, the patient felt relieved. Answered questions well and still showed rather marked feeling of well-being in contrast to his evident prostration. There is increasing evidence of a meningo-encephalitis. White blood cells 10,400, polymorphonuclears 85 per cent, lymphocytes 11 per cent, large mononuclears 1 per cent, transitionals 1 per cent, eosinophiles 1 per cent, basophiles 1 per cent. Spinal fluid shows 150 cells, lymphocytes predominating; smears and cultures negative; globulin plus.

On the fourteenth day there was a transient ptosis of the left eyelid and some difficulty in speech; coarse tremor of both hands; some weakness of grip; less responsive to stimuli and less clear mentally.

On the fifteenth day temperature 102 F.; pulse, 78; respiration, 20; blood pressure, 138-80; no marked change in condition.

On the sixteenth day patient appears to be gradually becoming more somnolent and lethargic; shows ptosis of left eyelid with external strabismus of left eye; left pupil widely dilated and does not respond to light or accommodation. White blood cells 10,000, polymorphonuclears 90 per cent, lymphocytes 9 per cent, large mononuclears 1 per cent.

On the eighteenth day catheterization of the bladder became necessary. Patient showed Kernig's, Oppenheim's, and Brudzynski's signs with increased knee jerks both sides, ankle clonus and some spasticity of muscles. Spinal puncture shows slightly increased pressure; cell count 240, with small lymphocytes predominating; globulin, 4 plus; albumen, marked trace; Fehling's not reduced; no organisms found; white blood cells, 8,800; polymorphonuclears, 91 per cent. Patient gradually became comatose; heart dilated; pulse, 140; respiration, 36; temperature became subnormal; lungs full of coarse, moist râles; cyanosis; death on the eighteenth day.

The brain was removed and a post-mortem report made available through the courtesy of the United States Naval Medical School, Washington, D. C. The brain showed the following findings:

Gross examination.—The specimen is a well-formed normal-sized brain, which is very pale in color over the basilar and lateral surfaces, but shows a moderate amount of congestion of the superior surfaces of both hemispheres along with a mild irritative surface exudate which extends along the perivascular tissue. The frontal poles are very pale, being covered by an edematous, milky-white pia-arachnoid. The optic chiasm, the mesial surfaces, the gyri recti, the infundibulum, and the perforated spaces and also the outer surfaces of the pons and medulla are covered by a thick, white, translucent gelatinous exudate in which the stubs of the cranial nerves are embedded, and which completely surrounds the branches of the basilar vessels. This exudate has glued together the temporal and inferior frontal surfaces so that separation of the sides of the Sylvian fissure is accomplished only with great difficulty. The exudate also extends over the superior surface of the cerebellum surrounding the corpora quadrigemina and completely submerging the pineal gland.

Sections of the brain exhibit an edematous cortex and a very superficial encephalitis. The basal ganglia are edematous and the perivascular lymph sheaths of these structures are widely dilated. The inner substance of the pons and medulla is swollen, cloudy, edematous, and in the upper junction of the pons and medulla in the anterior notch is seen a necrotic patch which is composed of infiltrated pia mater. The mesial surfaces of the frontal poles are very granular and show superficial inflammatory changes with a decortication of the outer layers. The ependyma of all ventricles is covered with minute elevations. The pia mater extends into the cerebral fissure and shows a thick white exudate and a few patches of blood pigment deposit. The midbrain structures are not remarkable, with the exception of some edema of the perivascular lymph sheaths.

Microscopical examination.—Section of corpora quadrigemina with overlying pia mater: The space between the corpora quadrigemina, the cerebellum, and the cerebral cortex is filled with tuberculous granulation tissue, which has distended the meshes of the pia arachnoid. Small round cells are deposited in great numbers and there is a general overgrowth of fibroblasts. Many new formation tubercles with necrotic centers and without giant cells are seen deposited in these structures. The pineal body is surrounded by round cells, fibroblasts and proliferating endothelial structures. The extensions of the pia mater into the brain structure show a heavy round cell infiltration and an occasional tubercle.

Section of pons and medulla with surrounding pia mater: The pia is filled with granulation tissue and an overgrowth of interstitial structure. Many new formation tubercles are seen and the vessels of the pia-arachnoid show a heavy round cell infiltration with com-

plete obliteration of architecture of the adventitia. In many of the vessel walls eccentric tubercles of small size are seen in process of formation. The inner layer of the pia is greatly thickened, filled up with round cells and has fused with the surface of the pons and medulla where the structures are undergoing widespread degeneration and a great round cell infiltration. Vessels of the pons show an infiltration of the adventitia and there is a mononuclear cellular exudate through the brain tracts and among the cranial nerve nuclei. Hordes of fat-laden mononuclear phagocytes are seen wandering through these tissues. The ganglion cells are all in a state of extreme cloudy swelling and hyaline destruction.

Section of the midbrain shows no internal changes such as might be expected in lethargic encephalitis, but the surface is closely adherent to the tuberculous membrane. Pia mater shows secondary inflammatory changes with perivascular infiltration, focal necrosis and general softening of the adjacent structures.

Section from temporal cortex shows a pia mater infiltrated with tuberculous granulation tissue in which the blood vessel walls contain numerous small tubercles and considerable hyaline degeneration. The extensions of the pia-arachnoid which dip into the deep fissures also show an enormous amount of exudate, miliary tubercles, and the presence of large numbers of tubercle bacilli. Secondary inflammatory changes are seen in the upper layers of the cortex.

Section of frontal cortex with overlying pia mater shows a mild, round cell infiltration of the membranes, congested vessels and edematous arachnoid spaces. The upper layers of the cortex are also edematous but no tubercles are noted either in the pia or in the cortical layers.

Section of ependyma of lateral ventricles. These sections show much irregularity in the ependymal membrane with localized hypertrophy and an occasional accumulation of the fibroblasts and round cells, probably early tubercle formations. There is a floky exudate over the surface of the ependyma.

Section of the cerebellum. Over the outer margins of the cerebellar leaflets are seen patches of tuberculous formation with infiltration of the adventitia of each ventricular wall. A few eccentric tubercles and many immature tubercles in the depths of the cerebellar fissures. The cerebellar tissues are pale and edematous, and the Purkinje cells evince the exhaustion phenomenon.

Diagnosis.—Basilar tuberculous leptomeningitis.

1. In many of the sections above described tubercle bacilli were discovered.

2. Thick walls of tuberculous tissue are seen in the adventitia of the vessels.

3. Ependymal lining of the ventricles presents small tubercles on the surface.

4. The meshes of the pia-arachnoid are distended with tuberculous granulation tissue.

5. No miliary tubercles are seen on the frontal, parietal, or superior surface of the brain, but the tuberculous exudate is limited to the basilar structures with extensions into the Sylvian valleys and over the superior surface of the posterior brain stem structure.

The following is the report on the heart, lungs, and brain of a guinea pig injected with cerebro-spinal fluid from the above case:

1. Nothing remarkable is noted in the heart and brain tissues.

2. The lungs are apparently considerably contracted and are sharply mottled with dark hemorrhagic areas.

Sections show these areas to be consolidated and filled with a hemorrhagic exudate which alternates with good-sized zones of air bearing tissue. Microscopically there is an enormous congestion of the alveolar arterioles and in patches the air sacs are filled with red blood corpuscles which alternate with other patches in which there are interstitial pneumonic changes with abundant production of fibroblasts and round cells along with epithelioid cells giving to the whole an appearance in general of recently formed tuberculous granulation tissue, although no definite arrangement into tubercles is seen, nor have tubercle bacilli been discovered in these sections.

The above case presents several points which bear a close resemblance to encephalitis lethargica. The onset with lethargy which persisted throughout the duration of the disease; the muscular twitching; the euphoria, which was quite marked; the third-nerve involvement and the spinal-fluid findings are very suggestive.

Against lethargic encephalitis are the late development of cranial nerve involvement; the marked meningeal symptoms and the rather high cell count in the spinal fluid.

CASE REPORTS UPON THE ADVANCEMENT OF OCULAR MUSCLES BY MEANS OF FOX'S TECHNIQUE.

By C. B. CAMERER, Lieutenant Commander, Medical Corps, United States Navy.

The above operations and the results thereof, as obtained in the eye and ear service of this hospital, are set forth herein as a substitute for the more radical and complicated methods as found in the current literature. Results have been uniformly good in the three cases reported herewith. For those who may not be wholly familiar with the technique the following description may not be amiss.

The lids and surrounding integument are carefully scrubbed with soap and water, followed by alcohol to the skin, and careful cleansing

of the conjunctival sac with argyrol 10 per cent followed by thorough douching with a saturated solution of boric acid. The head and face are covered with sterile towels or gauze. Depilation has not been found necessary, the above cleansing methods having proved adequate. The operator prepares as for a major operation. This seemingly unnecessary description for the preparation of both patient and operator is really of considerable importance, as there is often a tendency to be rather lax in performing eye surgery and

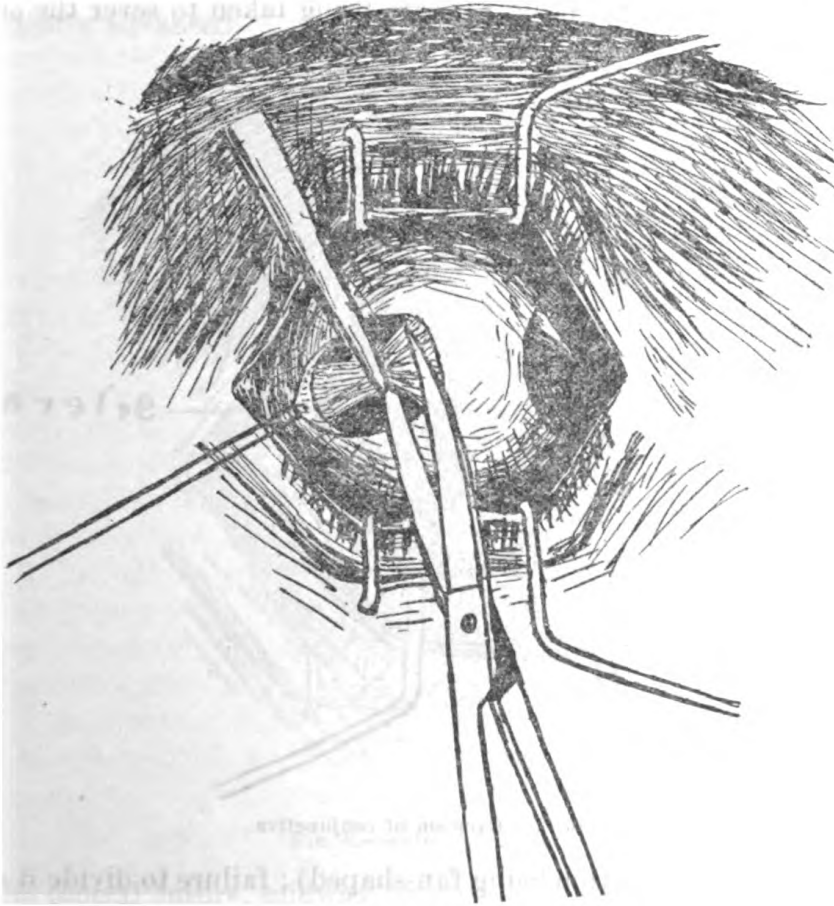


FIG. 1.—Tenotomy of internal rectus.

in an operation of this character any possibility of infection is to be most vigilantly guarded against.

A mixture of cocaine, 2 per cent solution, and adrenalin chloride, 1:1000, equal parts, is employed as the anesthetic. General anesthesia is impracticable as the patient is unable to rotate the eyes when so directed by the surgeon for purposes of comparison, judging the amount of correction necessary, etc.

The accompanying illustrations depict this operation for advancement of an internal rectus muscle in case of convergent squint.

When proper anesthesia is procured, the speculum is introduced, the conjunctiva above the cornea is firmly grasped with fixation forceps and held by an assistant in either extreme convergence or divergence, *opposite the line of deviation*, in case of divergent or convergent squint, whichever condition may be present.

The conjunctiva is then incised vertically with fine scissors about 9 m.m. from the limbus, thus clearing the insertions of any of the recti muscles. After opening Tenon's capsule the tendon is engaged with a strabismus hook and slight traction exerted. The tendon is now divided (Fig. 1), care being taken to sever the entire

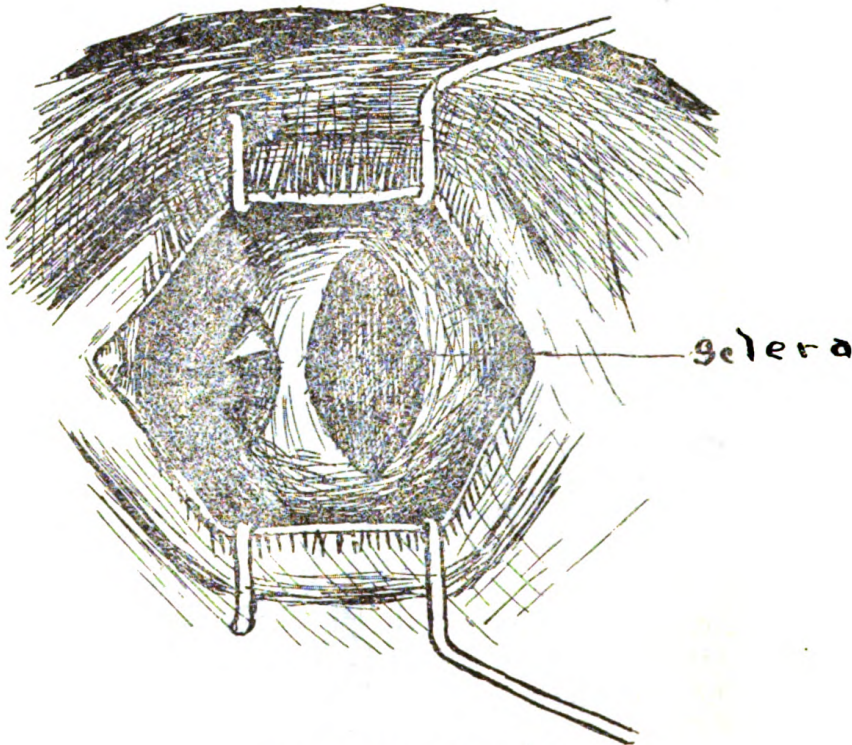


FIG. 2.—Excision of conjunctiva.

attachment (the insertion being fan-shaped) ; failure to divide it completely, even leaving a few fibers intact, may well defeat the operation.

The wound is now closed with two or three silk sutures, being sure Tenon's capsule is thoroughly closed at the same time. The eye is then held in extreme convergence or divergence *in the line of deviation*, and the Fox advancement forceps (cross-bar type) are employed to take a good, deep, vertical bite of conjunctiva and subconjunctival tissue down to the sclera (the size of this bite to be judged by the amount of squint present) on the opposite side from the tenotomy previously described, and about 2 mm. from the limbus. (Fig. 2.)

In closing this wound, the cardinal point is the proper placing of two stay sutures above and below the level of the cornea. These sutures, of black silk No. 8, are placed *toward* the center of the eye from the outer lips of the wound, and made to emerge above and below the center of the cornea respectively, sufficient traction being employed to produce slight wrinkling of the conjunctiva around the limbus. These stay sutures are designed to take up the amount of deviation and to overcome the hitherto excessive action of the tenotomized muscle and retain the eye in proper alignment until healing has sufficiently advanced.

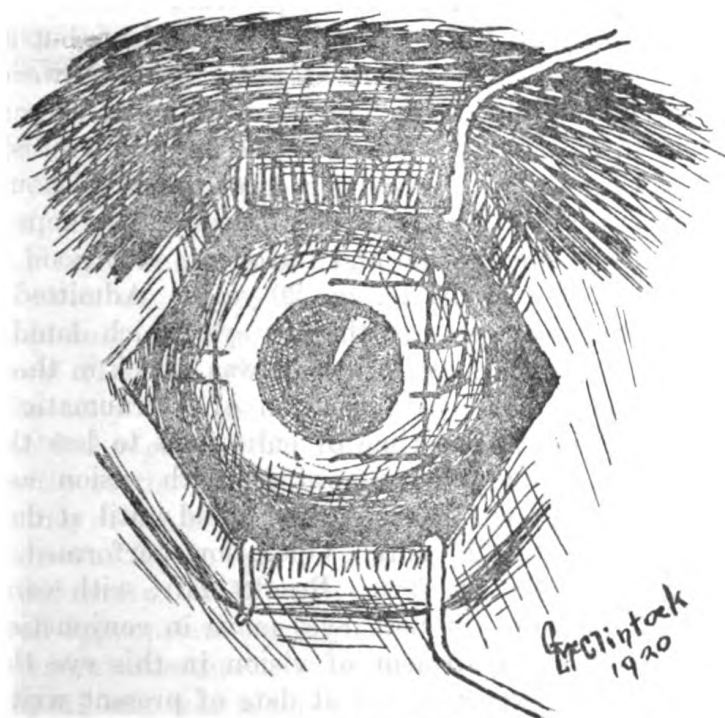


FIG. 3.—Sutures in place.

The central suture, midway between the two stay sutures, is now placed, the needle coming out through the tough circumcorneal tissue as near the limbus as possible. The remainder of the conjunctival wound is now closed with interrupted fine silk sutures as required to obtain good apposition, as appears in figure 3.

The eye is then irrigated with boric solution, followed by the instillation of 10 per cent argyrol. Both eyes are bandaged, and the patient kept in bed. Dressing is renewed the third day, the unoperated eye being left uncovered at this time. Sutures are removed the fifth day, all dressings being removed likewise, and amber or smoked glasses are then fitted and worn for a few days.

Three case reports with results obtained are as follows:

Case I.—A. B., lieutenant (junior grade) United States Navy, age 25, received a severe blow over the right eye while at the United States Naval Academy three years ago, since which time he has noticed a gradually increasing divergence. At the time of admission, January 5, 1920, this deviation was pronounced and he was unable to bring both eyes into alignment by any voluntary effort. Refraction revealed:

O. D. = $-.50$ cyl. axis 120.

O. S. = $+1.25$ sph. $-.50$ cyl. axis 90.

Divergence was considered too great and of too long standing to be corrected by the use of lenses. Operation January 18, 1920; stitches out January 23, 1920. Result was excellent, but slight divergence remained when eyes were at rest; fusion, however, being secured when patient fixed any object. Graduated exercises were prescribed in an attempt to develop the internal rectus. After eight months' time the results are very gratifying; without the use of lenses and with but little if any effort, the eyes are kept in alignment, and both binocular vision and fusion are very good.

Case II.—C. D. W., H. A. 1c, age 20 years. Admitted July 14, 1920, with marked divergence of the left eye, which dated from an injury received three years ago, when he was struck in the eye by a baseball, with the subsequent formation of a traumatic cataract, bringing down vision at the time of enlistment to less than 5/20. (Enlistment was made under a waiver, with vision as above.) This slight amount of vision has slowly failed until at date of admission it was about 2/20 only. Operation performed July 14, 1920; stitches out July 19, 1920. Results fair, with considerable divergence still present, but both eyes move in conjunction. Considering the marked impairment of vision in this eye the results are better than were expected, and at date of present writing what was gained (over half previous divergence) has been held. Enucleation of the lens is being considered, and with the aid of properly fitted glasses it is thought that his eyes may be brought into better alignment.

Case III.—C. E. H., C. M. M., age 37 years. Admitted July 6, 1920, with moderate intermittent divergence of the left eye, which had first been noted about two years ago, and which lenses previously worn had failed to correct. Refraction revealed:

O. D. = $+1.25$ sph. $+1.37$ cyl. axis 60.

O. S. = $+1.25$ sph. $+1.37$ cyl. axis 105.

Operation July 12, 1920; stitches out five days later. Results very good, binocular vision and excellent alignment being obtained. Above prescription fitted July 26, 1920, and constant use advised.

At present both cosmetic and functional results are very gratifying, with no return of symptoms.

While it is recognized that but three cases are a very small number from which to formulate any definite conclusions, still results have been so uniformly good, and the technique of this operation is so simple and readily performed, it is not considered amiss to present it for what it is worth. The only instrument necessary aside from those found in the Navy standard outfit is a pair of the special advanced forceps as devised by Fox, which are readily obtained at very nominal cost from any instrument house.

Acknowledgment and thanks for the drawings accompanying this report are due Lieutenant G. L. McClintock, Medical Corps, United States Navy, who has very whole-heartedly assisted in the preparation of this article.

TREATMENT OF A "SADDLE NOSE" BY A COSTAL CARTILAGE GRAFT.

By C. B. CAMERER, Lieutenant Commander, Medical Corps, United States Navy.

H. F. M., F. 2c., age 19 years. History of having sustained a kick from a horse upon the bridge of his nose at the age of 10 years. No repair work was performed subsequently.

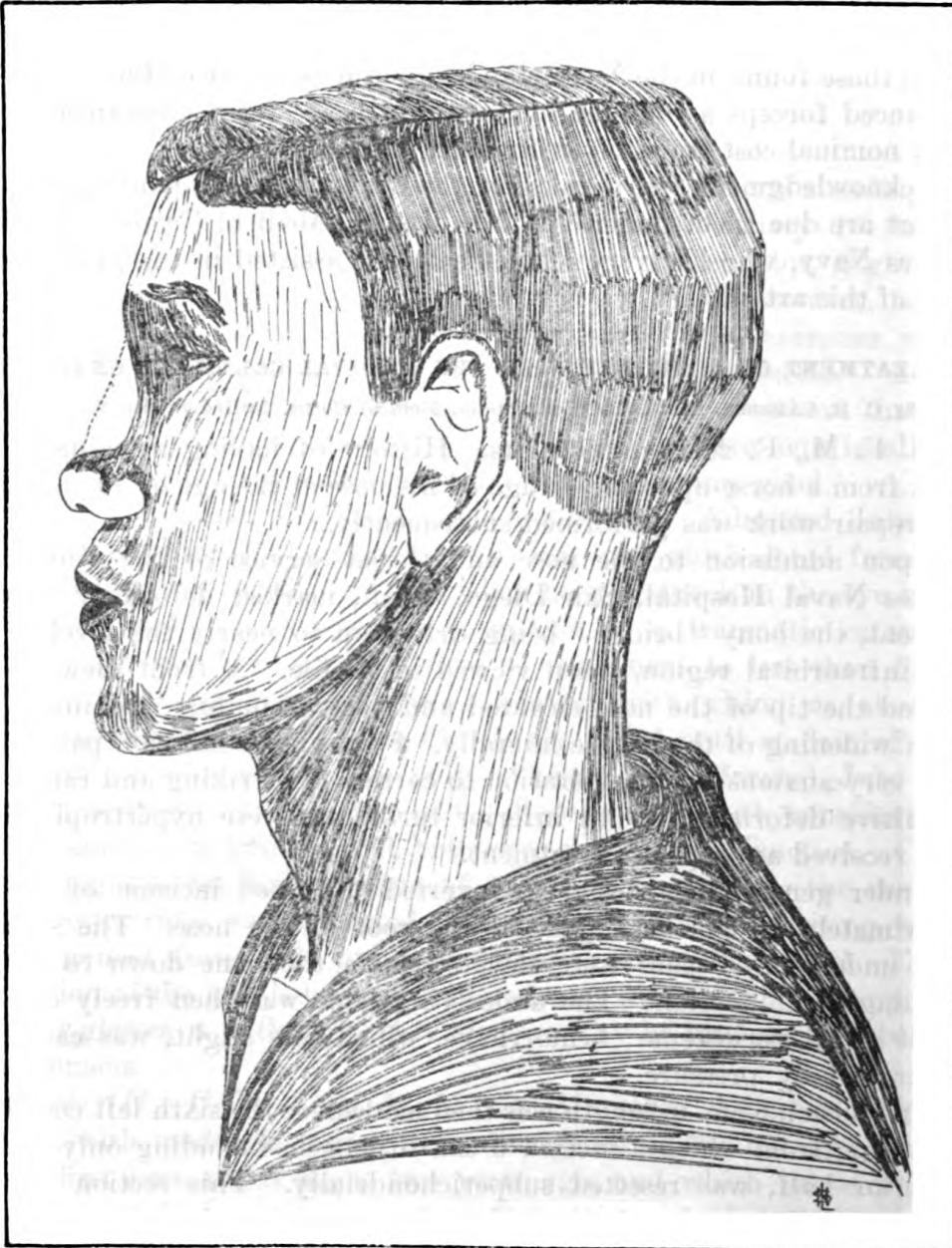
Upon admission to the nose and throat service of the United States Naval Hospital, San Diego, Calif., marked deformity was present, the bony "bridge" being driven in to nearly the level of the infraorbital region, when viewed in profile. A front view revealed the tip of the nose elevated and nostrils unduly prominent, with widening of the bridge laterally. Following admission patient was very anxious for an operation to correct the striking and rather repulsive deformity. Both inferior turbinates were hypertrophied and received appropriate treatment.

Under general anesthesia, an inverted U-shaped incision of approximately $1\frac{1}{2}$ cm. was made at the root of the nose. The skin and underlying tissues were elevated from the bone down to the cartilaginous junction. The underlying bone was then freely curetted of all periosteum; hemorrhage, which was slight, was easily controlled by pressure.

An incision 8 cm. in length was then made over the sixth left costal cartilage, from which a section 6 cm. in length, including only the superior half, was resected subperichondrially. This section was then carefully pared and trimmed to the proper length and breadth, and inserted in the pocket previously formed in the nasal tissues, and both wounds closed, the one over the sixth cartilage in the usual manner and the nasal wound with fine silk and the employment of delicate needles. Great care and rigid asepsis were exercised throughout, and the graft kept away from salt and other solutions and inserted only after careful drying with sterile gauze. Six days later

stitches were removed and results to date have proved to be highly satisfactory.

The accompanying cuts very accurately present not only a good likeness of the patient, but the condition prior to operation and results obtained.



Before operation. Dotted line shows new profile proposed.

Thanks and acknowledgment are due Lieutenant G. L. McClintock, Medical Corps, United States Navy, for the sketches accompanying this article.



End result of transplantation of rib section for repair of "saddle-nose" deformity.
398-1



Fig. 1.—Keloid formation right forearm, hand, and fingers.

398-2

A HAND PLASTIC.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

This patient was one of the survivors of a group of men who were handling several tons of black powder, when it was ignited. He suffered severe burns of the backs of both hands and forearms. This resulted in keloidal scars extending from the tips of the fingers to the elbows. (Fig. 1.) The keloid was so thick and dense that the motion of the wrists and fingers was greatly restricted.

A bridged flap of abdominal skin was decided on as the best method of repair. Since both hands were to be fixed, only one-half of the width of the abdomen was available for either, and thus the amount of skin that could be replaced was definitely limited.

Under nitrous oxide anesthesia the skin of the dorsum of the right hand was removed. This was as much as three-quarters of an inch thick in places and as hard and stiff as leather. A piece of heavy tinfoil was cut to the exact shape and size of the denuded area. This was placed in the proper position over the left side of the abdomen and the skin incised along the lines corresponding to the wrist and fingers. The bridge of skin was undermined and raised, all fat being separated from the skin. The hand was then inserted into this pocket and the abdominal skin accurately sutured to the skin of the wrist and fingers along the lines of incision. (Fig. 2.) Superficial necrosis occurred in a small area near the wrist, otherwise healing was rapid.

On the sixteenth day the flap was incised along the sides of the hand and fingers and the skin edges accurately sutured with horse-hair. By undermining and stretching the skin of the abdomen it was possible to bring the skin edges together and suture them. Slight infection occurred along the suture lines near the first finger and thumb. This was quickly controlled by the Carrel-Dakin technique, but the cosmetic effect was somewhat impaired. X-ray treatment was used to prevent further keloidal formation. The abdominal wound became infected, leaving a granulating surface about $1\frac{1}{2}$ inches in diameter. Small, deep skin grafts were applied to this area and produced rapid healing.

The result, six months after beginning the work, has been very satisfactory to the patient. (Fig. 3.) He has regained almost complete function of the wrist and fingers; circulation and innervation are excellent. He has been able to resume his work and his tennis. The new skin has tanned deeply and forms a sharp contrast to the white scar adjoining it.

Four months after the first operation we began to correct the webs of the fingers. The scar tissue between the first and second fingers extended halfway to the interphalangeal joint, interfering

with use of the fingers. A triangular flap was raised on the dorsal surface and a square flap on the palm. These were transposed and sewed to make a proper web. The dorsal flap, which contained considerable scar tissue, sloughed, but the palmar flap lived, and a very satisfactory result was secured.

Work on the left hand is not yet completed. Here the keloid on the backs of the fingers was even more disabling than that on the back of the hand. (Fig. 4.) All scar tissue was removed from the thumb, second, and fourth fingers. Flaps were raised from the chest and sutured over the raw areas. (Fig. 5.) Eleven days later these flaps were cut and the pedicles replaced to cover the raw areas on the chest. This has produced a very satisfactory result, although the skin of the chest is far from ideal for use on the fingers. That from the upper arm would have been far better, but the areas that would have served were covered with scar tissue.

After the work on all the fingers of the left hand is completed, the scar on the dorsum will be replaced in the same manner as that on the other hand.

**REPORT OF FORWARD DISLOCATION OF THE FIRST CERVICAL VERTEBRA
WITH FRACTURE OF THE LAMINA.¹**

By G. T. SMITH, Captain, Medical Corps, United States Navy.

R. St. C. B., apprentice seaman, United States Navy, on June 13, 1920, while diving in shallow water, struck his head on the bottom. He was brought to the yard dispensary and on the following day was transferred to this hospital with the diagnosis of strain of the muscles of the neck. On admission he was conscious and complained of stiffness and soreness of his neck. Examination showed his neck to be swollen and tender, with ecchymosis over the cervical region of the spine. There were no symptoms of paralysis. X-ray examination was not satisfactory, due to faulty development of the plate. Owing to absence of pressure symptoms the diagnosis was not changed. His condition steadily improved, and except for limited motion and some stiffness of his neck he made a good recovery. X-ray examination of July 3 was again unsatisfactory, but on August 4 a satisfactory plate was obtained by Dr. H. B. McCuen, of the Pensacola hospital, who was kind enough to take the picture, from which the accompanying illustration was prepared. It shows a forward dislocation of the first cervical vertebra almost to the entire depth of the body (about three-eighths inch), with also a complete fracture of the lamina, which appears to be separated about one-fourth inch.

¹ Reported from United States Naval Hospital, Pensacola, Fla.



Fig. 2.—Hand inserted under skin of abdomen. Note smallness of incision at the wrist.
400-1

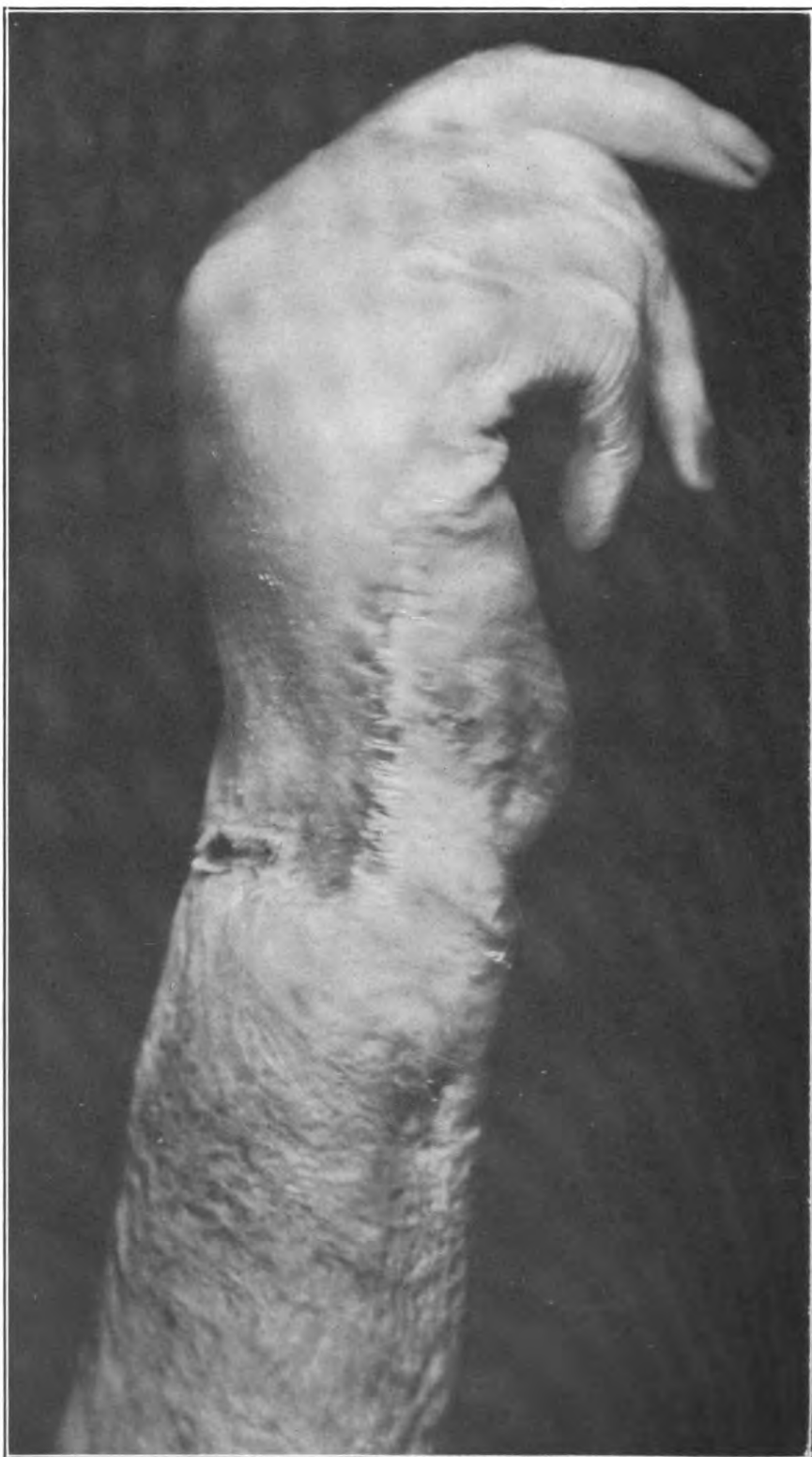


Fig. 3.— Flexion of hand after plastic.

400-2



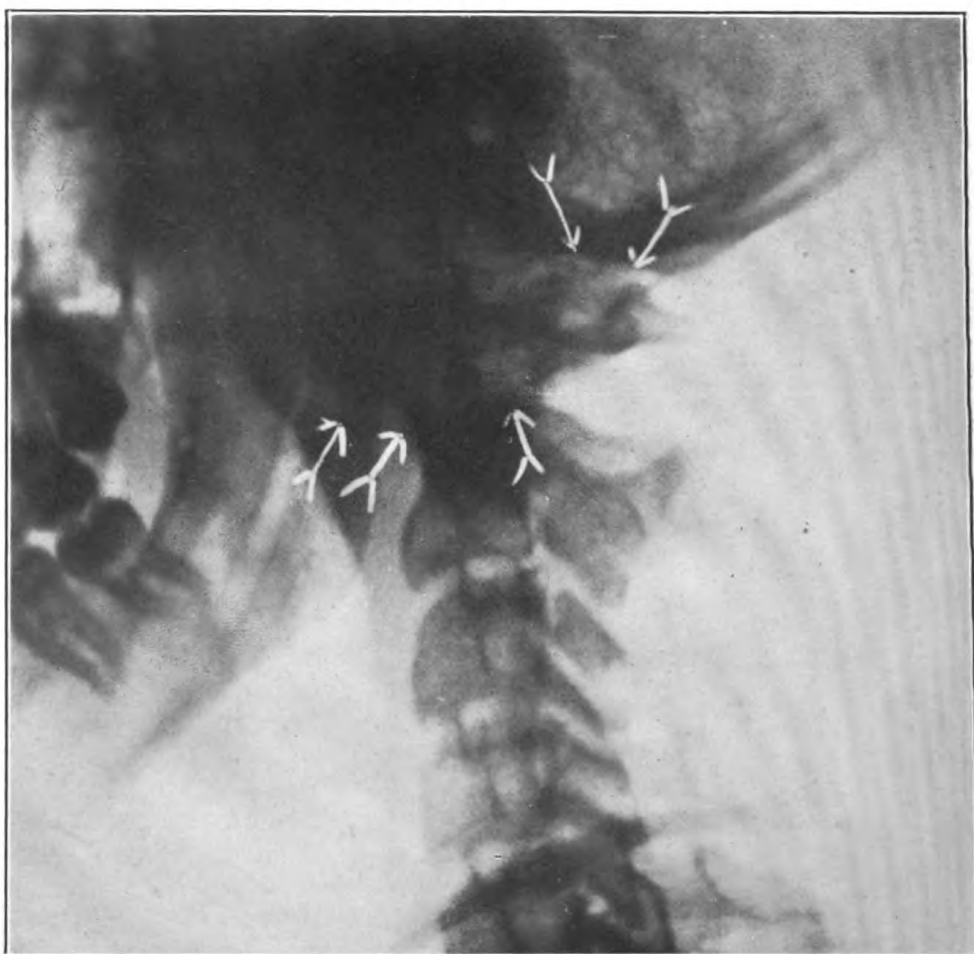
Fig. 4.—Keloid pronation, left hand. Note thick scar on fingers.

400-3



Fig. 5.—Flaps from chest applied to thumb and fingers. Note the pigmentation on right hand and the scar on the abdomen from which the flap was taken.

400-4



Forward dislocation of first cervical vertebra and complete fracture with separation of lamina.

401

This patient was transferred to the United States Naval Hospital, Philadelphia, Pa., on August 27, 1920, for further disposition.

This case is reported on account of the extent of the injury and the mildness of the symptoms. It is questionable whether any surgical procedure would be of benefit to him.

DEATH FROM NEOARSPHENAMINE.

By W. J. ZALESKY, Commander, and J. E. BELLINGER, Lieutenant, Medical Corps, United States Navy.

The patient was admitted to the United States Naval Hospital, Olongapo, P. I., November 2, 1920, at 5.30 p. m. Chief complaints—backache, headache in orbital region, and weakness. Diagnosis undetermined.

Physical examination negative except for extreme pain on palpation of the eyeball and mental confusion.

Past history: Health record shows several admissions for bronchitis, one attack of influenza, and a suspicion of tuberculosis in 1918. Admits syphilis several years ago and underwent three years' treatment, after which he was pronounced cured.

Present illness: Approximately five weeks ago reported to a medical officer with slight excoriations of mucous membrane on dorsum of penis, along the corona sulcus which had appeared three days after suspicious intercourse. He claimed to have had a similar condition before and stated that the sores were slow in healing. Examination revealed several simple excoriations, as though epithelium had been crushed away. All of these were situated on the dorsum of the penis, the frenum being healthy. A Wassermann test at this time was negative. He was told to apply copper sulphate once daily, wash with peroxide, and apply thymol or a calomel dusting powder. Lesions healed rapidly under this treatment, and Wassermann test in the two following weeks proved negative.

On October 4, 1920, or five weeks after his first visit, the patient reported with a faint pinkish, scattered, macular rash, the lesions being of the size of a pea, on anterior thorax only. Ulcerations healing and Wassermann at this time four plus. He was advised to go to the hospital for syphilitic treatment, but refused to be transferred and insisted on being treated aboard his own ship, as he was fit for duty. Repeated urgings were useless, as he was greatly worried about his condition and feared everyone would know about it. As the patient was able to perform his duties, and in view of his worried condition and repeated refusals to be transferred, it was deemed advisable to administer the treatment aboard ship.

On October 26, 1920, the urinary findings being negative, 0.6 gm. neoarsphenamine (Metz) dissolved in 20 c. c. sterile, freshly distilled water were injected into the cephalic vein of the left arm, four minutes being required to inject. Reaction consisted of nausea without vomiting, slight temperature, feeling of malaise, which passed off in a couple of hours. He attended to his duties that evening. The remainder of the week he felt better and seemed to worry less.

On October 31 he was given another 0.6 gm. of neoarsphenamine (Metz), prepared and administered under the same conditions as before. Reaction was the same as before, and he attended to his duties that evening.

On November 1 he had a temperature of 101.5°, headache, orbital pain, backache, and a feeling as though he was going to have dengue, as he expressed it. He was up and about, but had no appetite.

On the following day his evening temperature was 99.5°, with diminution of above symptoms but a lack of distinctness in speech was noted, and he appeared greatly worried, nervous, and very weak. He still refused to be transferred to the hospital, but his condition justified transfer without approval. Admitted with above symptoms. About 11 p. m. that evening his talk was rational but indistinct at times, he being able to answer direct questions satisfactorily. Early next morning the patient was in a state of negativism (stupor), not responding to questioning, and having marked photophobia, with pupils slightly dilated, all reflexes exaggerated, and sphincter control lost. Examination of first urine specimen negative (obtained by catheter) and leucocyte count 3,300; blood pressure 118-75. Vomited all liquids by mouth. Treatment: Elimination, Murphy glucose drip, stimulation as required. The patient gradually passed from stupor to coma. At 11 p. m. November 3, pulse dropped from 72 to 54, breathing labored, Cheyne-Stokes in type. Examination revealed beginning pulmonary edema. Spinal puncture showed clear fluid, not under pressure; only two cells counted in nine c. mm. and no globulin. At 12 midnight received 300 c. c. normal salt solution intravenously; stimulation with adrenalin continued. After 4 a. m. November 4, did not respond to further stimulation, and breathing became exceedingly difficult. Patient was catheterized and about 100 c. c. of urine obtained. This showed acid reaction, heavy trace of albumin, many granular, epithelial, and hyaline casts.

Diagnosis changed to acute nephritis. Pulse gradually became weaker and patient died at 6.45 a. m., November 4, 1920, having one convulsive seizure with his last breath. Wassermann on spinal fluid the following day was negative and on blood 4 plus. Autopsy findings showed enlarged kidneys with small punctate hemorrhages; spleen greatly enlarged, dark in color and soft; all organs showed acute parenchymatous degeneration.

A review of the literature shows that this is a typical case of the fatal results that occur from the arsenical treatment of syphilis. The chief points brought out are: A rapid yet unalarming prodromal stage, characterized by early negative urinary findings which changed markedly in 24 hours; nervous symptoms, uremic in character, which rapidly increased in severity with a lack of definite brain or spinal involvement as shown by physical examination (except exaggerated reflexes) and spinal fluid examination. The heart in this case responded markedly to adrenalin in 20 minim doses until within four hours of death. Pulmonary edema setting in within 48 hours, followed by a rapid termination of the case, completes the clinical picture. This case, like the great majority, followed a *second* injection of the product.

A CASE OF THROMBOSIS OF THE LATERAL SINUS AND INTERNAL JUGULAR VEIN.

By E. E. KOEBBE, Lieutenant Commander, Medical Corps, United States Navy.

On May 25, 1920, C. A. H., A. S., age 20, was admitted to the United States Naval Hospital, Great Lakes, Ill., with a diagnosis of otitis media, acute. He complained of earache, right ear; sore throat, headache, and pain in his chest.

His family history is negative. He had measles, mumps, and whooping cough in childhood, but has always been healthy and robust. He never had an earache or discharging ear until the present trouble began. He enlisted in the Navy in January, 1920, and was sent to Newport. In March he was on the sick list for seven days with tonsillitis, his first attack. From May 7 to May 14, after transfer to Great Lakes, Ill., he was on the sick list with bronchitis, acute. From the time that he returned to duty until he developed an earache on May 19, he was not free from what he termed "a cold."

On May 19 he had a slight earache, but did not report to the sick bay until May 20, when his ear had begun to discharge slightly. His drum membrane was punctured, but his earache continued and became more severe. After four days of treatment in the sick bay he was transferred to the hospital.

Examination on admission showed the right tympanic membrane pulsating, swollen, bulging, and reddened, with a slight discharge of sero-purulent material from a small perforation. His mastoid bone was not tender, neither was there a bulging of the posterior wall of the external auditory canal. His tonsils were swollen, inflamed, and had several infected crypts, typical of acute follicular tonsillitis. His larynx was inflamed and his voice husky. He coughed a great deal. Examination of the chest showed slight dullness, increased vocal

fremitus and increased breath sounds over the upper lobe of the right lung, probably beginning pneumonia. The patient appeared rather septic.

The right tympanic membrane was incised to afford better drainage. This was followed by prompt cessation of pain in the ear and a more copious discharge. On admission his temperature was 102 F.; this dropped to 100 F. by the next day and remained normal or slightly elevated in the afternoon, but was never over 100 F. for the next four days.

On May 31, without warning and after he was apparently very much improved, his laryngitis, tonsillitis, otitis media and lung findings having subsided, he was seized by a very severe chill. His temperature very rapidly became 105 F. In about six hours his fever had disappeared and he had no new complaints. Being a native of Texas, malaria was suspected, but a blood smear was negative for parasites. Twelve hours after the first chill a second one occurred equally severe and the temperature again became 105 F.

Sinus thrombosis was now suspected. His ear had improved so that the discharge was hardly perceptible, the swelling of the drum had diminished so that the landmarks were easily made out and there was no pain in the ear or over the mastoid. His chest still gave a few signs, but had cleared up considerably since his admission. Tuberculosis was a possibility.

On June 1, the patient had a low-grade fever, stated that he felt well and there were no signs pointing to his real condition. The next day he was seized with a third severe chill, this time lasting one-half hour and again followed by a temperature of 105 F. Following this chill, he complained of some pain in the region of the anterior border of the sterno-cleido-mastoid muscle. There was no visible swelling of the neck. Palpation revealed a few enlarged lymph glands due to his recent tonsillitis. On deeper palpation over the right jugular vein, it was questionable whether a cord-like swelling could be felt. The patient appeared extremely toxic, but continued to state that he felt well. There were no reflex changes, nystagnus or nerve involvements. Examination was entirely negative except for a few chest signs. An X-ray of the chest was taken. The report stated that there was an evidence of resolving broncho-pneumonia.

The diagnosis of lateral sinus thrombosis was made from the history of otitis media, no other cause for the septic temperature being found, and from the probable palpation of the jugular vein.

It was decided to operate at once to ascertain the condition of the mastoid cells and the lateral sinus. As the patient was very septic and had not entirely recovered from broncho-pneumonia, and as there were possibilities of a rather prolonged operation, it was decided that he was not a particularly good risk for a general anesthetic.

As I had previously performed mastoidectomies satisfactorily under local anesthesia, it was considered the method of choice in this case.

The usual mastoid incision was made. The outer table of bone was normal. The mastoid cells also were apparently normal; no evidence of pus or granulation tissue. The inner table of bone was not diseased. On exposing the sinus, it was found not to pulsate, had a pale bleached-out appearance and a putty consistency. As the mastoid was not involved, the infection evidently had traveled through the attic to the superior petrosal sinus and then to the lateral sinus or else through the floor of the tympanum to the jugular bulb.

As the patient was becoming somewhat irritable and restless, it was decided to administer ether before ligating the internal jugular vein. An incision was then made along the anterior border of the sterno-cleido-mastoid muscle from a point one inch below the mastoid tip to about one inch below the level of the lower margin of the thyroid cartilage. The sterno-cleido-mastoid muscle was retracted and the carotid sheath exposed after dividing the anterior belly of the omo-hyoid muscle.

On opening the carotid sheath it was noted that the jugular vein did not pulsate and was not collapsed. The skin incision was extended downward to the clavicle and the vein exposed and ligated as low as possible. At the point where it was ligated it was not collapsed, but contained a thrombus that was beginning to organize. All the tributaries of the internal jugular were now ligated and a portion of the vein about 3 inches long excised. The upper end of the vein was not ligated, but was brought to the surface for drainage. The vein was then probed upward to its entrance to the skull. No flow of blood was obtained, showing that the inferior petrosal sinus was probably thrombosed. A large gauze pack was placed in the wound, which was closed by suturing the skin and superficial fascia with interrupted sutures.

A longitudinal incision three-fourths of an inch long was now made in the lateral sinus. The sinus was filled with disintegrated blood clot and pus, which on culture revealed streptococci. A flexible probe was passed upward and posteriorly in the sinus, a distance of about 2 inches, and churned slightly until there was a free flow of blood. This was allowed to flow momentarily, to wash out as much infected material from above as possible. The hemorrhage was easily controlled by packing the upper angle of the wound. The contents of the lateral sinus were now wiped out as far downward as possible and irrigated with normal salt solution. The lower angle of the sinus incision was left open for drainage. The cavity in the mastoid bone was packed with gauze and only a few stitches taken in the upper portion of the skin incision, so as to allow free access to the lateral sinus for post-operative dressings.

The patient was given the usual treatment to combat shock and reacted well from the anesthetic. On each of the first two days following the operation he was given 100 c. c. antistreptococcus serum intravenously. The serum was omitted on the third day, but was given again on the fourth and sixth days. One hour after the serum was given there was always a frank chill with slightly more elevated temperature. The serum was discontinued at this point because there was practically no difference in the temperature chart on the days when it was given and when it was not given. On the other hand, the patient seemed more restless, had more headache, and appeared languid during the nights following the serum. On the seventh day 500 c. c. normal salt solution and 100 c. c., 1 per cent sodium bicarbonate solution were given intravenously. This seemed to combat his toxicity perceptibly. Forced feeding was resorted to as much as possible.

The patient ran a very septic temperature for the first week following the operation. It was usually normal or nearly normal in the morning, with an afternoon or early evening elevation to 104 F. or 105 F. The second and third week were marked by gradually diminishing temperature, so that by the end of the third week it was normal or nearly so during the entire day. There were no subsequent flare-ups. The pulse was accelerated in proportion to the elevation of temperature throughout the course of the disease.

The portion of the jugular vein that was brought to the skin surface drained freely for about two weeks. The neck wound healed practically by first intention and was completely healed in about three weeks. The mastoid wound was allowed to granulate from the bottom and was practically healed in two months. The patient lost considerable weight, but regained it rapidly. There was no paralysis of any nerve. In August tonsillectomy was performed. His tonsils were found markedly hypertrophied and contained crypts filled with caseous material. Five months following the operation the patient has completely recovered.

ORCHITIS COMPLICATING ACUTE FOLLICULAR TONSILLITIS.

By J. D. BENJAMIN and T. C. QUIRK, Lieutenants, Medical Corps, United States Navy.

M. S., apprentice seaman, United States Navy, reported at the dispensary complaining of chills, fever, and difficulty in swallowing. Examination of the patient showed the presence of an acute follicular tonsillitis. Temperature was 103 F., pulse 128. There was considerable exudate on both tonsils and the case was a typical acute follicular tonsillitis. A culture was made and proved negative for

diphtheria. The patient was put to bed in a room by himself and given the following treatment: Catharsis, 15 per cent solution of silvol applied to tonsils and administration of salicylates by mouth.

Four days later the patient complained of pain and swelling in the testicles. Examination revealed a swelling in both testicles, a double orchitis. There was no evidence of urethritis, no swelling nor could tenderness in the area of the parotid glands be elicited. Ichthyol ointment was applied to the scrotum and the patient kept in bed in isolation. Two days later his throat had entirely cleared up but the swelling and tenderness of the testicles remained.

Finding no other apparent cause for the orchitis except the tonsillitis it was decided to change the diagnosis to orchitis following tonsillitis and the removal of the tonsils was decided upon.

On June 23, both tonsils were removed under ether. There was no evidence of the presence of adenoid tissue.

On June 26, the patient was up and around feeling better. The left testicle had become almost normal in size, soft, and not painful. The right testicle was somewhat improved but was still slightly tender.

On June 29, the patient was returned to duty, as the right testicle had greatly decreased in size. The patient was seen one month after operation and was feeling fine. The right testicle still remained very slightly swollen but was hardly half the size it had been at the onset of the orchitis.

This case is reported because it is believed that it is rather an unusual one. It is the first case that has come to the notice of the writers, although it is mentioned in some of the textbooks. It is thought that the diagnosis—orchitis following tonsillitis—made was correct, due to the fact that the pain and swelling subsided following tonsillectomy.

OPERATIONS FOR TRAUMA OF THE URETHRA.

By W. L. COWLES, Lieutenant, Medical Corps, United States Naval Reserve Force.

There is so little literature on traumatic urethral operations and so much confusion in many minds respecting the manner of procedure and the aftertreatment, that I welcome the opportunity to report two cases of traumatic rupture of the urethra entering this hospital during the course of one week. It is unusual to see two cases in so short a time. In view of this and of the end results obtained, I desire to report them, calling especial attention to the slighness of the accidents that may produce such injury and the slight symptoms complained of at the time of the accident, the major symptoms being deferred until an attempt to pass water.

Case 1.—H. C. P., B. M. 1 c., age 29 years. Entered the hospital at 9 a. m., giving history as follows: While entering the hatch at 1 a. m., his foot slipped and he came down astride the hatch combing. Patient said it took his breath away for a few moments, and he felt pain, but this soon passed away, and he finished what he was doing and retired for the night. Several hours later he got up and started to pass his water, when he found he was unable to do so, suffering extreme pain as though steam was burning him. The pain extended along the whole course of the urethra and through the perineum, producing a sickening, nauseated feeling. The patient was transferred to the United States Naval Hospital, Chelsea, Mass., about 8 a. m.

By this time he said the tissues had become a little more deadened, though he was still suffering intensely. The patient was seen by me, in consultation with Dr. E. A. Vickery, about 9 a. m., at which time he was suffering intensely. There was cold perspiration over the forehead and the body, the patient appearing to be in a state of shock. The perineum was swollen and ecchymosed, the ecchymosis extending along the course of the perineum and posterior wall of the scrotum and about one-half inch into the anus, then radiating out into the thighs. Attempts to pass a catheter or sounds showed that it was impossible. The patient was immediately prepared for operation. There was no bleeding at any time through the penial end of the urethra.

Case 2.—E. J. F., F. 2 c., age 20 years. Patient gave history that he was going up to put a flange on a steam light, lost his balance, and fell about 6 feet, landing astride an air chamber. His breath was taken away by the severe pain. He felt faint, and thinking that he was cut, looked at himself to find that he was bleeding from the penis. He said the pain soon eased up and because of the bleeding from the penis he was taken over to the hospital ship to see the doctor, who transferred him to the hospital. On entering the hospital, patient said that he attempted to pass water and then began to suffer intensely, with a burning pain throughout the surrounding tissues, as described in the first case. Upon examination he was found to be suffering severe pain, the perineum swollen, very tender, with slight ecchymosis in the perineum. Attempts to pass a catheter were without result. The patient was prepared immediately for operation.

In both cases the operation and treatment were as follows: A sound was passed into the perineal end of the urethra as far as it would go without force, a longitudinal incision was made through the skin and the sheath of the corpus spongiosum exposed and incised. In the first case we found the hematoma superficial, as the

fascia of Colles had been ruptured. In the second case we did not come upon the hematoma until the fascia of Colles had been incised, at which time we came upon a dark blood clot with an increase of fresh bleeding. In both cases the perineal muscles were bruised and permeated with blood. Sponging the tissues off carefully, the end of the sound could be clearly seen. The proximal end of the urethra was completely torn away and great care had to be taken to find this end. Pressure was exerted over the suprapubic bladder, and with careful sponging a spurt of urine was detected in one of the pockets. This was picked up and the edges caught with silk for retraction. Attempts to pass a sound along the course of this pocket into the bladder were successful. After assuring ourselves that both proximal and distal ends of the urethra had been recovered, the next question was the best means of closing to prevent later stricture. Having this in view, we sutured with fine catgut on the horizontal plane about two-thirds of the circumference of the urethra and then the suture was reversed and the rest of the urethra was sewed with fine catgut on a longitudinal plane, attempting not to allow the ends of the horizontal plane to come directly in contact. By doing this we believed that at no point would there be a complete band of cicatricial tissue, but some sort of healthy urethra would be along the whole course. As soon as this was sewed, the sound was removed and a catheter of large size was passed through the penis into the bladder, allowing the urine to flow out, which assured us that the catheter had entered the bladder. The catheter was anchored for continuous drainage and a cigarette drain placed in the perineal incision extending through Colles's fascia. Fine catgut brought all surfaces to their normal relationship and the external wound was closed with silkworm gut. The patient was put to bed with continuous drainage through the catheter in the penis.

After treatment.—The bladder was washed out twice a day with a bland antiseptic followed by an injection of one-half ounce of 1 per cent mercurochrome. The cigarette drain was taken out on the third day and the perineal wound healed without infection, and practically no drainage. In neither of these cases did we have infection of the perineum; the recovery was uneventful; the continuous drainage catheter was removed on the tenth day and sounds every third day thereafter for two weeks, after which they were passed once a week for two weeks. At no time did these cases develop any cystitis, and, as has been stated, the perineal wounds healed rapidly, with no infections, the patient making uneventful recovery with a free flow of urine and taking a 26 sound with no discomfort.

SEASICKNESS.

By C. E. HENRY, Commander, Medical Corps, United States Naval Reserve Force.

A seasick man is not able to do full duty. During my short time of duty on board the U. S. S. *Solace* the Hospital Corps would always have a portion of its number more or less incapacitated if we were at sea. A very small percentage of the Hospital Corps on board were in the regular Navy and had previous sea service. No record was made of these temporary indispositions, as few of the men were so sick as to require being placed on the sick list.

We had a few cases of nausea marina transferred to us for survey. Two cases in particular attracted my attention, as it was thought there was exaggeration of symptoms to secure a survey.

All of the hospital corpsmen and many of the crew that showed symptoms of being easily affected by going to sea as well as the cases transferred were questioned and examined to discover if possible the cause. Two very striking symptoms were prominent by their frequency: First. Tenderness over McBurney's and Morris's points. Second. Tenderness over the gall bladder. No record was kept of these examinations; therefore no percentage estimate may be given. The question of chronic appendicitis or chronic gall-bladder disease causing a person to be susceptible to sea sickness was discussed with some of the medical officers, but the literature at hand did not give us much definite information. Since returning to private practice the recent literature on the subject has been reviewed.

Lewis Fisher, of Philadelphia, states emphatically "Sea sickness, therefore, is an ear phenomenon. While movement of the lymph in the internal ear is the underlying cause of sea sickness, nevertheless it is self-evident that the most prominent symptoms, namely, nausea and vomiting, are not ear manifestations, but rather nervous on the one hand and gastric on the other, nausea being produced by a disturbance of the central nervous system and propulsive vomiting by a contraction of the diaphragm and the stomach."

The observations of James and Kreidel, who noted that deaf mutes did not become seasick and, acting on this, experimented on animals, severing the eighth nerve, and observed that such animals could not be made seasick, are quoted and referred to in several articles.

It is not the intention to dispute that the disturbance of the lymph in the internal ear will cause seasickness. It is to advance the opinion that there may be other causes, and in many instances a man be saved from being incapacitated while at sea. In line with my observations P. Cazamian, the chief medical officer on board the cruiser *Jean Bart*, made a special study of seasickness for two years. He is convinced that the abnormal sensations and stimuli induced by

the movements of the ship act on the nervous system of the vegetative life (autonomic and sympathetic nerves). "The hyperexcitability of the sympathetic nervous system is manifested in higher blood pressure, tachycardia, inversion of the oculocardiac reflex, and dilatation of the pupils. The symptoms suggest excessive production of epinephrin at first, then the suprarenals become exhausted, and the blood pressure drops. Persons inclined to sympatheticotonicity are peculiarly predisposed to seasickness, while the vegotonic escape." In dealing with the treatment his opinion is: "We know no drug that will check the functioning of the sympathetic nerve; the next best thing is to act on the antagonistic nervous system. By influencing the vagus with atropine we thus indirectly control the sympathetic. The question whether epinephrin or atropin is called for in the individual case is easily answered by the oculocardiac reflex." Nathan Rosewater, of Cleveland, Ohio, in his own, and his brother, Marcus Rosewater's, practice secured excellent results by the use of atropine alone or atropine and strychnine or tablets of aloin strychnine and belladonna. In the summary of his article on Sea Sickness and Allied Conditions he states: "By increasing the normal, but often insufficient peristaltic force of the stomach and bowels with drugs such as aloin, belladonna, and strychnine and thereby preventing antiperistaltic forces overpowering the normal peristalsis, a simple and practical method is offered to prevent or correct seasickness or car sickness, which has thus far met with perfect success."

The effect of chronic appendicitis or chronic gall-bladder disease on the stomach is well known and needs no discussion. The path traveled is largely through the sympathetic nervous system. One medical officer while on board had several attacks of stomach trouble and abdominal pain, but would not consent to a diagnosis of appendicitis and operation. He was seasick whenever there was much ship motion. Since his return to civilian practice he has been operated on for appendicitis. One other officer on board who was easily affected had a tender appendix and often had to be careful of his diet. There were six, possibly seven, cases that can now be recalled, of acute exacerbation of chronic appendicitis subject to seasickness and operated upon by Commander C. C. Tyrrell, Medical Corps, United States Naval Reserve Force. They were in the ship some time after operation and it was observed that they were cured of seasickness.

I do not recall any case of gall-bladder disease associated with a history of seasickness that was operated on. One hospital corpsman who got very seasick would be very tender over the gall-bladder area for several days after an attack.

CONCLUSIONS.

1. Seasickness may be caused by the movement of the lymph in the internal ear.

2. Chronic appendicitis and chronic gall-bladder disease acting through the sympathetic nervous system cause an increased susceptibility to seasickness.

REFERENCES.

Lewis Fisher. Seasickness and internal ear stimulation. *New York Med. Jour.*, Vol. CVI, No. 12, p. 542.

Lewis Fisher and Isaac H. Jones. Vertigo and seasickness. *New York Med. Jour.*, Vol. CIV, No. 3, p. 99.

G. Dragotti. Seasickness. *Policlinico*, Rome, vol. 27, No. 7, Feb. 16, 1920, p. 200.

A. E. Lemon. Treatment of seasickness. *Jour. Am. Med. Assn.*, vol. 73, No. 2, p. 104.

P. Cazamian. Seasickness. *Bull. et mém. Soc. méd. d. hôp. de Par.*, vol. 43, No. 22, June 27, 1919, p. 638.

Nathan Rosewater. Prevention and treatment of seasickness and allied conditions. *New York Med. Jour.*, Vol. CIX, No. 17, April 26, 1919, p. 727.

TREATMENT OF THE "WEST INDIAN CHANCROID."

By W. H. MICHAEL, Lieutenant Commander, Medical Corps, United States Navy.

After a considerable period in the observation and treatment of the venereal sore in the West Indies, and after consultation with many medical men in the same field, I have come to the conclusion that for all practical purposes the West Indian venereal sore is always syphilitic.

The diagnostication of primary syphilis by ordinary microscopic examination has never proved satisfactory in my hands and it is usually conceded that, without the dark-field examination, a demonstration of the organism of syphilis in 50 per cent of cases is about as good as can be expected.

It has been accepted that the probability of a permanent cure of a case of syphilis decreases rapidly with the duration of the infection.

With the three points in the above paragraphs, as a basis for action, the following routine has been instituted in the eastern district of Santo Domingo for the treatment of venereal sores.

In the first place the idea of the importance of early treatment was made clear to the men during the course of weekly venereal lectures and the men were urged to report at once at the suspicion of any sore. This advice has been so well followed that no venereal

sores have been discovered at San Pedro de Macoris at the weekly inspection for venereal disease.

When a man reports with a venereal sore he is given a dose of 0.6 gram of arsphenamine intravenously the following day and the dose is repeated at the end of one week.

Under certain circumstances—as in case the patient is transferred from an outpost, he does not receive his first arsphenamine injection until he has had the sore a week or more—a third or even fourth dose of the drug is given. In this routine arsphenamine has been used, not from preference, but because until recently neo-arsphenamine was not available. The latter is now being used and has the advantage that the patient gets his first injection more promptly, usually an hour after reporting.

This treatment has given very satisfactory results and no secondary symptoms have developed in any cases so treated. Two cases of secondary syphilis have developed in this district since this routine has been used and these help to demonstrate the first point, namely—West Indian venereal sores are syphilitic.

The first of these two cases had an insignificant sore which was diagnosticated “dhobie itch” at an outpost. The second developed in one of two court-martial prisoners accused of rape. One of these two prisoners had already developed gonorrhea and the second reported a slight urethral discharge which was negative for gonococci. As his partner in crime had gonorrhea the possibility of an intraurethral chancre was not thought of until secondaries had developed.

The objections that will naturally be made to the above method of treatment would be as follows:

(a) Some men who are not infected with syphilis may get useless treatment.

(b) The treatment may only hold the disease in abeyance so that it may afterwards reappear.

The useless treatment in a few cases is admitted, but the treatment received does not do any harm and often relieves mental anxiety.

The possibility of the second objection is also admitted. However, it has been my privilege to make the diagnosis of syphilis by the demonstration of parasites in a venereal sore of about one week's duration. This case received one dose of salvarsan and no other treatment, and was followed by frequent Wassermanns for a period of about two years, during which time the Wassermanns were always negative and no symptoms of syphilis developed. It is admitted that the conclusion from a single case may be faulty, but on the other hand the probability of a complete cure is certainly far better by the use of the above methods than by waiting for a positive Wassermann, the development of secondaries, or placing reliance on the

negative findings of the ordinary laboratory methods of examining smears from venereal sores.

In conclusion, the above method is not advocated where there is a dark-field apparatus available with a dependable laboratory expert. In the absence of these ideal conditions this routine treatment of venereal sores seems to give the best results possible.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander Lucius W. Johnson, Medical Corps, United States Navy.
Lieutenant Commander H. L. Smith, Medical Corps, United States Navy.
Lieutenant A. H. Ehrenclo, Medical Corps, United States Navy.
Lieutenant A. L. Lindall, Medical Corps, United States Navy.
Lieutenant J. J. Sale, Medical Corps, United States Navy.

GENERAL MEDICINE.

STOKES, J. H. Application and limitations of the arsphenamines in therapeutics. *Arch. Dermat. and Syphilol.* September, 1920.

Ten years have not sufficed to determine the full availability and the precise limitations of arsphenamine therapy in spite of the assiduous work of numerous investigators. One thing is certain. Arsphenamine is "only one factor in a complex" and "what it accomplishes in one case may be no guide to its efficacy in another." The profession has long since abandoned the discoverer's early expectation that it would have a specific action and mathematical exactness. A study of the literature of the subject affords convincing proof that there is no standard curative method. "Almost anything will cure some patients, almost nothing avails in others."¹

Two general methods of administration are in vogue. One is the massive or intensive technique and involves a maximum concentration of the drug in the blood maintained up to the limit of the patient's toleration. Thus a decigram or two for a number of days in succession or a maximum dose for two or three days is given. "The logical field for the massive technique is the stage of the disease in which the infecting organism is accessible, both in blood stream and tissues." In the later stages when the organism is walled off by infiltrations and fibroses accumulations radical destructiveness to the spirillum is not to be expected. "If we are to employ a drug such as arsphenamine at such a stage, we should, it seems to me, employ it

¹The Bureau of Medicine and Surgery has steadfastly declined to act on the insistent suggestion of many zealous members of the corps to promulgate an official standard treatment—i. e., to establish a routine treatment of so many injections in a given length of time—to be regarded as in some sense a cure or at least a conscientious effort to obtain a cure. The careful study of each individual patient and of the relation of his disease manifestations to therapeutic agents is nowhere more imperative than in the case of syphilis and arsphenamine. (Editor.)

by a technique which brings out more of its immunity stimulating power, even though it may be at a sacrifice of some of its direct spirillicidal action."

The immunizing technique should mean a moderate dosage, at safe intervals and with rest intervals, administered for a long period. The moderate dose begins at one-half and increases to two-thirds of the Ehrlich maximum. "A safe interval is one week. An average series or period is from six to eight injections. An average rest interval between series is from 4 to 12 weeks. An average number of such series is three or four."

The two types of technique may be combined in a variety of ways for all degrees and types of infection. The early stages certainly call for massive therapy. The author does not go beyond three almost maximum doses in nine days and follows them with an attempt at immunity building by eight or nine weekly injections before permitting a rest interval of not more than four to six weeks. But the more radical authorities give three doses in three days.

The concurrent use of mercury is indispensable. The more massive the arsphenamine therapy the more strongly is mercury indicated, not as a destroyer of the spirillum but as an immunity stimulator. "It must be so used in conjunction with every type of arsphenamine administration that it fills in the gaps between the action of its more spectacular confrere with solid substantial resistance. Why not rely on it entirely? Because its action is slow when speed is most needed, and its toxicity is high, especially in prolonged administration. Arsphenamine is the broom that sweeps, mercury is the club that crushes. More than once one is impelled to wonder whether overmassive mercurialization does not wreck the patient as it 'cures' the disease. Arsphenamine, on the other hand, discriminately employed, has a tonic action that is an inexpressible relief from the depressant action of mercury."

Arsphenamine and mercury, especially in early cases, are best used simultaneously, not alternately. The author is positively *opposed to the use of the insoluble preparations* of mercury as synergists of arsphenamine. "The leaving of mercurial depots of unknown capacity in the tissues of patients of unknown resistance and tolerance in the early months of a course of treatment which may last heaven only knows how long, is an adventure in speculative therapy that my experience with the kidney in syphilis will not countenance. The 4-gram, 30 to 50 per cent inunction and the soluble mercurial salt, as simultaneous and interim treatment, have for the past three years accomplished all I could desire of mercury in the treatment of syphilis."

The author holds to a minimum of 18 to 24 arsphenamine injections, massed in the first year, to an early case. "These I mass into the first

year, employing the spirocheticidal opening attack of three injections in nine days, as part of the first course of eight injections, and from four to six weeks intervals between the later courses of six. Mucous recurrences, a test of the effectiveness of an average technique, and not uncommon after 12 unsystematic and scattered injections, have thus far never developed in my experience in such a course with its accompanying 300 inunctions. With inunctions given in courses of 40 and 80, and with rest intervals of one and two months overlapped by arsphenamine, it will be apparent that mercurialization extends a considerable period beyond the cessation of the arsphenamine phase."

In late syphilis more leisure and observation is justified. "Thus the average late interval is from four to six months between arsphenamine series, instead of the corresponding number of weeks, and the tonic action of the arsphenamine is distributed throughout the mercurialization phase, instead of being sacrificed to spirillicidal action by being massed ahead of it, as in early infections. At the same time, a decided measure of spirillicidal effect in the late infection is conserved by the massing of the groups of arsphenamine injections into compact units instead of scattering them by long intervals between individual injections."

Intensified treatment is not so well borne in the later stages when the victim is handicapped by the deleterious effects of the disease, by age, etc., and the limitations of the drug's power are distinct.

"The arsphenamines are the drugs of election where there is marked renal damage and in acute syphilitic nephritis. Schamberg and his collaborators have estimated its toxicity for the kidney as one-fiftieth that of mercury, for example.

"The liver metabolizes arsphenamine and stores arsenic. Watch it, therefore, to forestall accidents, and when it is structurally damaged, reduce dosage and expect lowered general tolerance of the drug.

"The arsphenamines are distinctly vasculotoxic. Such effects are particularly serious in vascular syphilis of the brain and in the damaged myocardium, and compel a greater dependence on mercury. The vasculotoxic effect seems especially marked in acute processes, and probably blends with the Herxheimer reaction.

"Arsphenamine, when first administered, produces a flare-up of a syphilitic process which is proportional to the acuteness of the process and the size of the dose administered. This so-called Jarisch-Herxheimer reaction, familiar enough in the eruptive period, occurs at every stage and with varying intensity in every structure affected by syphilis. If a large dose is given in the presence of a sluggish process or a small dose in an acute process there will be a focal response which is of some assistance in diagnosis. On the other hand,

if a large dose is given in an active process the seriousness of the outcome will be proportional to the importance of the involved structures. Thus a manifestation intrinsically no more serious than a gummatous ulceration of the larynx may be responsible for death by asphyxiation through edema caused by a Herxheimer reaction from overdosage in an active though late process. The estimation of the acuteness or activity of syphilitic process and the importance of the structures involved thus constitutes an important factor in determining the advisability of using arsphenamine with or without preparation, and in moderate or large dosage. Mercury, because of its slower action, should be a preliminary to the use of arsphenamine in all first courses of treatment when important structures are involved. The more acutely the nervous system in particular is affected, the longer should the mercurial preparation be. As a mercurial for preparation purposes, I prefer a soluble salt, unless there are renal contraindications or cardiac decompensation, in which case the slower inunction is desirable."

Tolerance for the arsphenamines is reduced by foci of septic infection, acute respiratory infections, complicating febrile conditions—especially tuberculosis. Pyelonephritis, severe cystitis, enlarged prostates, all diminish tolerance. A history of previous cutaneous disorder is important.

Painstaking attention to the study of the patient and to the technique of administration are, of course, *de rigueur*. Special attention should be given to focal infections that tend to sensitize the skin, as shown by pruritus, patches of dermatitis in groins, axillae, wrists, etc. With such patients do not use inunctions during the course of arsphenamine. A safe rule is to hospitalize for 24 hours the cases receiving arsphenamine. At the Mayo Clinic 25,000 injections have been given to patients under hospital care with 2 deaths attributable to the drug.

Arsphenamine has been at once a worker of miracles and a disappointment in neurosyphilis. An important measure is the routine examination of the spinal fluid with the last injection of each course. Intraspinal arsphenamine therapy must not be exclusively relied on when the nervous system is involved. General therapy, attention to focal infection and urinary retention, and general hygiene are of prime importance. In the absence of distinct contraindications, the neurosyphilitic in the early stages should receive at least one stiff course of arsphenamine intravenously, preceded by inunctions or injections of soluble salts of mercury.

In syphilitic children and pregnant women arsphenamine is of wide application, but must be given in conservative dosage. Interstitial keratitis yields more readily to arsphenamine than to mercury.

"Comparisons between arsphenamine and neo-arsphenamine still rest on uncertain and ill-assorted data. * * * It is my habit to estimate seven injections of neo-arsphenamine equivalent to five of arsphenamine. * * * My own experience compels the belief that neo-arsphenamine in the past has been more tricky and vasculotropic than arsphenamine, especially in large doses. Possibly the elimination of methyl alcohol from its manufacture will correct the difficulty. In the meanwhile arsphenamine commands my personal confidence where radical effects can be secured.

"No discussion of the applications of arsphenamine to therapeutics is complete without a mention of its possibilities in the prophylaxis of syphilis. Where a known exposure has occurred within 24 hours I have employed two injections, given on successive days. The experimental aspects and possibilities deserve further study. It should be forcibly stated that such a procedure is under no circumstances to be employed later than 48 hours after exposure, nor is it ever to be employed in the presence of any suspected primary lesion."

The paper ends with a plea for conservation in the use of arsphenamine. "I feel strongly that it is a major duty of all to whom circumstances have assigned the material and the facilities for such work, to provide in time, by closer observation, by follow-up, and by adequate record, for the exact data on which alone can be based a final evaluation of the arsphenamines in therapeutics." (J. S. T.)

TALLERMAN, K. H. Rectal absorption of glucose. Quarterly Jour. Med. July, 1920.

The value of rectal injections of glucose has been so much discussed, so various are the claims made by different investigators, that the author decided on some simple experiments to determine rate and amount, if any, of blood sugar increase following rectal administration.

Sixty grams of solid glucose were dissolved and made up to 180 c.c. with normal saline. This was slowly injected in the usual manner. Ten minutes were allowed for the fluid to run in and it was retained. Half-hourly samples of blood were taken up to the end of three hours and a final sample at the end of the fourth hour. The blood was tested by Maclean's method. (Biochem. Jour., Cambridge, 1919.)

The conclusions arrived at are: Absorption takes place; the maximum is in 1 hour 20 minutes; the average rise at this time is 0.03 per cent, but probably this does not represent the total absorption. Variations in individual cases may have been due to partial breakdown and decomposition of glucose due to bacteria in the rectum.

The process should be borne in mind. The absorption appeared to be from the rectum proper. Other investigators have reported a reversed peristalsis carrying the solution into the small intestine.

When carbohydrate is injected per os the maximum rise in blood sugar occurs in 30 minutes and amounts to 0.05 to 0.06 per cent increase. The return to normal is in about four hours when glucose is given by rectum; much more quickly when given by mouth. Concentration seems to be a factor in absorption and without deleterious effect.

The author has not experimented with dextrin, but notes that it is equally efficacious, cheaper, and, being a colloid, can be used in higher concentration. (J. S. T.)

MENTAL AND NERVOUS DISEASES.

ABRAHAMSON, I. **Mental disturbances in lethargic encephalitis.** Jour. Nerv. and Ment. Dis. September, 1920.

The toxins of lethargic encephalitis act as a poison to protoplasm. All cells are attacked, individually and in mass. Under its influence cell life becomes torpid, the functional activity dependent on it lessens, and the correlation of that activity to the needs of the whole cellular confederacy becomes deranged. Irritability both to internal and external stimuli diminishes and decreased vital tone of the afflicted host occurs.

This toxin has a selective action on nerve cells. Therefore, functional correlation which is chiefly nervous suffers more than that which is partly mechanical or chemical. The more dependent a function is upon nervous mechanism the more it will suffer. And since thought is entirely dependent on cerebral nerve cells, it suffers largely and mental disturbance arises. According to the stage of the condition and the severity of the infection do the various symptoms appear. Somnolence and insomnia, mania and depression, delirium and coma, confusion and catatonia may all be seen, but these are variations in the severity and phase of the condition and not in its nature.

At first the patient has difficulty in attending to his work. Then there is yawning and perhaps irritability of the overtired, from lack of interest, and from desire for sleep. The eyes close. Sometimes this is from paresis or weakness of the upper lids, sometimes from photophobia or from a combination of all of these factors. With eyes closed the patient dozes and wakes, and has less appreciation of the passage of time. He lies on his back as if in a peaceful deep sleep or trance, without sound nor movement for hours, without conscious or unconscious initiative. Physical discomfort may not concern him.

From this depth he may respond promptly to questions with short coherent answers, but with no loss of orientation or memory, and no tendency to perseveration, and promptly thereafter resumes his sleep. Requested muscular movements are made without hesitation; slowly and stiffly perhaps, with direct return to somnolent immobility. He asks no questions, has little concern for the gravity of his condition. His attitude expresses a desire to be left alone and he sometimes says so. There is at this stage no incontinence, but he does not spontaneously seek relief, these visceral demands seeming to have lost their power to command. The depth of the somnolence has no relation to the blood picture, blood pressure, or the temperature, and may last for days or weeks. This state usually disappears, with some broadening of the consciousness, and some self-interest, and is followed by a period of mild depression. The eyes may remain closed, but the patient changes his position, complains especially of utter weariness and of no relief in sleep. There is self-commiseration, weariness, sleeplessness, which wears off very slowly. Sometimes chorea follows and rapidly induces exhaustion.

Again, the somnolence may deepen into a stupor which resembles a drug intoxication. Late at night, when vitality is lowest, there may be a restless delirium with spontaneous movements and sounds. The movements are purposeful, graspings and pointings at unseen things; the sounds are mutterings and ramblings, cries, often incoherent or maniacal. In the quiescent intervals the patient lies inert. His responses to insistent commands are automatic, and these tend to perseverate. The face is waxen, corpselike, masklike, with complete lack of emotional expression. The voluntary muscles are somewhat rigid, and tend to remain in the position placed. The patient lapses into a state variously known as catalepsy, *flexibilitas cerea*, narcolepsy, or catatonia, according to its severity. Following this, there may be confusion, faulty orientation, and loss of memory of the Korsakoff type, and as a rule a very real depression in which there may be anorexia and other inhibitions, lack of initiative, and perseverance; or the stupor deepens into coma, which as a rule ends fatally. The coma may also appear suddenly as a terminal condition more largely due to the acidosis than the specific toxin of the disease.

The author mentions the opinions of MacNalty regarding the blocking of incoming sensory stimuli to the cerebrum via the sensory fibers passing through the optic thalamus by lesions in this region, thus perhaps causing a ptosis, placing the patient in darkness, and depriving the consciousness of activity, all of which is conducive to somnolence and stupor. But the author notes that the blind tabetic is not somnolent, and states that while these incoming sensory stimuli may be favorable to such a condition they are

not even relative to it, for it can arise independently of such lesions and disappear when they persist. And further, that there is no relation between the depth or duration of the somnolence and the severity of the lesions. The mental disturbance is characteristic of an intoxication.

In the motor activities is read the mental state. The immobility of the patient indicates a retardation of the associative processes to such an extent that such concepts as do arise do not find expression; stimuli from the environment that would ordinarily produce a response now do not. The brain ignores sensory stimuli which are without doubt pouring into the brain, but the existing order persists and associations favorable to the new order of the claimant sensations do not arise. And, therefore, the motor equivalent does not arise. From the somnolent state the first response is to auditory stimuli. These are the most compelling of all stimuli in arresting attention and the barrier of choice of action is removed also. These are responded to in an accurate and economic manner, but slowly. Then the patient resumes his lethargy. Later the response is faulty and hesitant, and then there appears a tendency to perserverate the required response; in other words, the associations of the new order remain dominant, the retardation is too great to allow of the return of the old order. This may explain the hallucinations and delusions that occur with the stupor, and that occur in low states of consciousness found in other infectious diseases or induced by the action of drugs such as opium, hashish, etc. The explanation that the inhibition of incoming sensory stimuli denies support and activity to the consciousness, thus allowing the no longer repressed subconscious stimuli to come to the surface, wild and uncontrolled, as delirium, is probably untenable, for there is no usurpation of conscious action by a subconscious cerebration.

The part of the cell affected is not yet known, and while the absence of recorded changes in the cell body may be due to imperfect technique, it may signify that the synapse is the portion of the cell that has the greatest chemical affinity for the poison of lethargic encephalitis. But any poison which reduces the vitality of the cell raises the resistance at the synapse. (A. H. E.)

ABRAHAMSON, I. **Chronicity in lethargic encephalitis.** Arch. Neur. and Psych., Vol. 4, No. 4, October, 1920.

In observing many cases of lethargic encephalitis, among Jewish people in New York City, it was found that the febrile stage usually lasted from 10 to 20 days. They were usually discharged at this time. But the early hope that this was final was soon dispelled by the return of many cases. Three elements in the disease are distin-

guished: (1) The disease agents; (2) the effect of these on the tissues invaded; and (3) the physiologic and psychologic consequences of these morbid effects. The agents persist actively considerably beyond the 20-day limit. The destruction in nerve, vascular, and even glandular tissue is often permanent. Following this there often results a progressive functional deterioration, or a gradual disorganization of an associated function, so that the possibilities for a chronic condition are many.

The disease agent can give rise to a continuous or remittent fever. This fever is probably the tissue response to the organism, but even after the fever subsides the organisms may still persist in sheltered sites where, even though their virulence is reduced, they may produce progressive lesions. Or, possibly, a toxicity remains that sets up cellular damage whereby a local reaction of repair develops. Buzzard is mentioned as having shown in late cases of lethargic encephalitis that atheromatous changes occur in the blood vessels of the central nervous system. Calcification only occurs where there has been a preceding cellular degeneration, but we do not know whether the toxin producing this vascular damage is derived directly or indirectly from the organism of lethargic encephalitis. The further implication of the endocrine glands may account for many abnormal chemical changes. These would effect all body cells, while this change is found almost solely in the blood vessels of the central nervous system.

The persistent structural changes are found in the highly organized nerve, vascular, and glandular cells. This is inferred from the altered physiology. Some are not permanent, due perhaps to the absorption of exudates and the slow destruction of the organism, thus allowing functional recovery of some of the less damaged cells. The period of observation—18 months—has not been long enough to accurately foretell the degree of permanence of recovery of the various functions.

The persistent signs are considered under the groupings somatic, endocrine, and mental. Of the somatic, the persistent signs and symptoms are fatigability, diplopia, blurred vision, optic neuritis and atrophy; faulty accommodation, nystagmoid movements in extreme lateral positions, and slight differences in width of the palpebral apertures; lack of facial expression, tongue tremors and deviations, peripheral palsies, a pseudo-Parkinson syndrome, fine and coarse tremors of the extremities; a hemiplegic spastic attitude of the upper extremity, dragging of the leg and increased resistance to passive movements with exaggerated deep reflexes, propulsion and retropulsion, unsteadiness and titubation, careful, short, or unequal steps and other disturbances of gait and attitude; chorea, athetosis, dystonia, epilepsy, aphasia; all varieties of sensory disturbances, and a trans-

verse myelitis syndrome, which may lead to death from decubitus or pyelonephritis.

As persistent signs of endocrine disturbance are noted obesity, menstrual irregularity, especially amenorrhea, Sargent lines, dermographism; Von Graefe, Möebius, and similar eye signs; hyperidrosis and anidrosis, polyuria, low blood pressure, persistent slow pulse, and tachycardia, either constant or paroxysmal; labored breathing and asthma; impotence and medullary crisis.

The mental symptoms of the acute stage may persist in mild form for some time, especially if there have been signs of meningo-encephalitis. The appearance of being stunned may remain for months. There may be a partial or complete amnesia for the period of illness with effort to fill the memory gaps by confabulation, particularly if there has been a psychosis of the Korsakoff type. Irritability, willfulness, and anxiety, or depressions and hypomanias may be seen. Hebephrenic episodes, and even fully developed psychoses may appear, perhaps due to hereditary tendencies brought out by the infection. To the patient's incapacity is often added emotionalism, and signs of hysteria and neurasthenia are often prominent. Children are similarly affected, often remaining drowsy by day but wakeful and irritable at night.

The nature of many of the signs and symptoms is probably often an expression of the reaction of the disease in certain types of persons, and under various conditions. There may be thus distinguished a group of chronic cases resembling Parkinson's disease, chronic choreas, progressive dystonias, and a fourth, the cases of progressive myelitis with usually a fatal ending. Multiple sclerosis is mentioned as not being a sequel to lethargic encephalitis. (A. H. E.)

PRINCE, M. **Babinski's theory of hysteria.** Jour. Abnormal Psychol., Vol. XIV, No. 5, December 1919.

Babinski's teachings have developed a new conception of hysteria in the French school. In this concept the classical symptoms such as paralyses, anesthetics, convulsive seizures, are looked upon as being induced through suggestion and not as essential manifestations of the condition. This group of symptoms becomes considered as the disease condition itself—hysteria.

Babinski divides the phenomena of hysteria into two groups: (1) Those which can be reproduced or dispelled by suggestion, including convulsive attacks, paralyses, tremors, disturbances of phonation, respiration, sensation; (2) those that are not influenced by suggestion, such as dermatographism, abnormally intense and prolonged emotional reactions, including tachycardia, erythema, excessive

sweating, and disturbances of intestinal glands. To the first he would limit the term hysteria, while the second he would designate by the usual terminology, dermagraphism, etc.

The pathological state of hysteria can be looked upon as a function of dissociation (disintegration, repression, or inhibition) of one or more normally integrated psychoneurological systems, manifesting itself on the one hand by the loss of certain mental and neurological functions, and on the other by the activity of certain functioning systems. This abnormal activity would express itself because of the disintegration, in uncontrolled response to excitation, commonly known as automatisms. Such abnormal activity might be manifested either by the remaining associated systems or by the disintegrated, cast-off systems. Examples of such disturbances in the mentality from loss of function are amnesias, confusional states, unconsciousness, dumbness, multiple, or dissociated personalities, and from undue activity or automatism are hallucinations, deliria, fixed ideas. In the neurological field we have from loss of function, paralyses, anesthasias, and from undue activity, contractures, tremors, convulsions. Combinations of such loss of function and of undue activity in the mentality give various clinical pictures, such as alterations of character, fugues, somnambulisms, and other well known types.

Babinski maintains that hysterical stigmata are always the result of suggestion which may be autogenous or heterogenous.

The author agrees that hysterical manifestations do arise in, and are induced by, psychological factors, but not as sources; they form settings and create points of view and sentiments whose emotional impulses excite conflicts between thought systems or induce defense reactions that result in dissociation of the integrated psychoneurological or psychophysiological systems. Such a condition may deprive the personality of various functions organized or integrated within the dissociated system, or subconscious systems may be produced that express themselves in automatisms. But such a complex mechanism can not be interpreted as a suggestion.

The underlying mental state of hysteria is in the nature of a dissociation of a psychomotor or psychosensory system as in a paralysis or anesthesia, respectively.

Since Babinski maintains that suggestion alone is the cause, then does suggestion alone produce dissociation? A mechanism allowing inhibition and dissociation is a necessity in normal mentation and neurological activity. When one in a state of absent-mindedness, or deeply engrossed in reading does not hear a bell ringing or feel a fly crawling on his skin he shows a dissociation of the psychosensory field, in other words, an anesthesia, analogous to that manifested by

hysterics. In automatic writing there is anesthesia of the writing hand. The dissociation of the motor system has robbed the personality of the associated (integrated) sensory field.

Functional amnesias are the result of dissociation and are classical symptoms of hysteria. Yet these are not due to suggestion, especially those suddenly appearing as fugues or somnambulisms. Multiple or dissociated personalities are merely types of hysteria, and these often show bizarre stigmata peculiar to each phase of personality. One such showed complete anesthesia, another was anesthetic to touch or pain. Cases are recorded wherein one phase exhibited one form of paralysis, another phase a different form, and in a third none at all. These cases show such stigmata immediately following shock without any intervening period of "meditation."

Babinski failed to find any evidence of hysterical manifestations in the emotional reactions of distressed relatives in situations at the Paris morgue, thus apparently proving that emotions do not give rise to hysterical symptoms. But the simple discharge of an emotion as a biological reaction to the environment would hardly induce psychophysiological disintegration and automatisms.

The essential thing is the organization of the emotional instinct in a system of ideas, and it is this entire system that discharging its emotional impulses induces disintegration. Without such an organized system or complex we should not expect the disruptive effects.

Babinski also uses the phase of "meditation" after an emotional shock to show that the hysterical manifestations, paralyzes, and anesthetics have time to originate from some form of auto or hetero suggestion. Close study, however, shows that at the emotional period immediately following the shock, hysterical mental symptoms appear of a marked character, such as amnesias, hallucinations, deliria, inability to respond to questions, apparent incapacity to perform a voluntary act, states of hebetude, stupor, confusional states, states allied to fugues, mental dullness, irrational states, tachycardia, tachypnoea, tremor. These, excepting the last three, which are only the physiological manifestations of emotions, are merely states of dissociation with automatisms, or are the unregulated and uncontrolled functioning of disintegrated psychological systems. In the modern point of view these are typically pure symptoms of the hysterical state. These symptoms were found in Babinski's own series of cases. They were not induced by suggestion but by something else, and this at least is conditioned by emotion.

The fact which seems to have been brought out during this war is that the hysterical state manifested by mental dissociation can be induced immediately under mental stress and strain at the moment of the emotional discharge. The difference in time of the appear-

ance of various symptoms in the same case does not in itself substantiate any idea of suggestion. The explanation is not so simple. It may be "defense reactions" according to one theory; but the psychological mechanism of a defense reaction is complicated. This may be due, in individual cases, to mental conflicts, subconscious mechanisms of different kinds.

There is a difference between the normal state of mind and that of a person who has undergone some sort of psychological trauma or shock. The latter readily develops hysterical afflictions, while the former does not. The average man does not develop hysterical manifestations, nor do most cases of organic nervous disease. Such cases are examined continually and left in association with hysterics yet do not develop hysteria.

"Babinski's fundamental error is not recognizing that the hysterical state is one of functional dissociation and that any psychological factor capable of producing such a dissociation, whether it be emotion or a conflict, is capable of producing hysteria. The mechanism by which individual symptoms are produced is another problem. It may be suggestion, as we all know, or it may be a very complicated mechanism which still requires solution." (A. H. E.)

BAILEY, P., AND HABER, R. **Mental deficiency.** *Ment. Hyg.* July, 1920.

Of 72,323 cases of nervous and mental disorders reported by the neuropsychiatric examiners of the United States Army Medical Corps, 22,741, or 31.4 per cent, nearly one-third of the rejections for nervous or mental causes, were mental defectives. Add to these the mental defectives rejected by local examining boards and the total reaches 26,545. The thoroughness of this work is attested to by the comparatively few defectives that were reported from the American Expeditionary Forces and by the relatively low number of military offenses in this country and in France, for the defective is prone to delinquency.

Mental deficiency is the psychiatrist's most urgent problem, for it is by far the most frequent of all mental conditions. Its close social and economic relations and wide distribution have hardly begun to be recognized, nor have adequate efforts been undertaken to meet it. Mental defect is 3 times more frequent than drug inebriety, 20 times more frequent than alcoholism, 3 times more frequent than insanity. It affects our penal system, systems of education, and economic development.

The above figures are the basis for the estimate that there are 6.5 defectives for every 1,000 men examined between the age of 21 and 31 years, exclusive of institutions, or 65.650 male defectives

of this age period. If this ratio were uniform among all ages there would be 353,210 male defectives; and if uniform for all ages between 18 and 45, there would be 164,710 male defectives in this group. As a matter of fact mental defect has a high mortality, especially in youth, affecting those under 18 years, so that the estimates would understate the number as related to the entire population.

Mental defectives are apt to stay at home, so that a greater percentage was found among drafted men than among volunteers. Among neuropsychiatric patients, alcoholics offered themselves more freely than mental defectives. Mental defectives will reveal themselves in disorders of conduct, a slow and often dangerous process. They take longer to train, they hold back brighter men, they are dangerous because at times they are inadvertently placed in positions of responsibility. By the use of regular routine intelligence tests and psychiatric examinations delay in elimination was avoided in 42 per cent of the cases. Twenty-eight per cent were referred by medical officers and 25 per cent by line officers, showing very satisfactory cooperation. Great benefit was obtained from the assignment of neuropsychiatrists to divisions in this country and in France. There were 562 white and 71 colored cases diagnosed mental defective who were referred for misconduct. While this is a small number, mental deficiency formed 40.5 per cent in whites and 64 per cent in colored, heading the list of neuropsychiatric conditions found among neuropathic delinquents. At Leavenworth, mental deficiency was not so frequent among the neuropathic delinquents as at the camps. About 90 per cent of mental defectives were eliminated within the first six months of the enlistment period and of training-camp life.

Within the mental defective group 32.6 per cent were imbeciles, 63.2 per cent morons, and 4.2 per cent border-line cases. Among attendant associated neuropsychiatric disorders, psychoneurosis leads with 1.3 per cent in whites and 1.7 per cent in colored; hysteria, psychasthenia, and neurasthenia being the most frequent forms. Epilepsy was next in order of frequency. The prevalent types of constitutional psychopathic state were paranoid personality, pathological liar, and the sexual psychopath. The principal nervous disorders were syphilis of the central nervous system, tremors, tics, and chorea.

The paper is most instructive and illuminates a large problem in civil and military life. Many tables are given which clearly show the great volume of important sociologic data and associations made use of. (A. H. E.)

SURGERY.

FISCHER, W. E. **Resuscitation in death under anesthesia.** Brit. Med. Jour. November 6, 1920.

The importance of attempting resuscitation after death under anesthetic is not generally appreciated. Resuscitation should be attempted when the opportunity is not delayed beyond 30 minutes. The various tissues retain molecular life after cessation of somatic life for periods varying with the type of organization. Connective and epithelial tissues survive for days; muscle tissue for hours. Deprivation of nutrition arrests in 30 minutes the life of delicate nervous tissue on which vital systemic processes depend.

There is considerable ignorance and prejudice on the subject. Surgeons should be prepared to take the necessary measures, and fear of peritoneal infection, etc., should not restrain them in the face of certain death without intervention.

There is an unfortunate disposition to limit efforts at resuscitation to artificial respiration which is almost useless when the cardiac function is once lost. It is true that artificial respiration may induce a renewal of the heart action, but this only holds for a minute or two. If, under artificial respiration, the heart does not begin to beat in 2 minutes, massage of the heart is indicated. In using the manipulations of the Sylvester method (according to E. Ward, Brit. Med. Jour., Feb. 21, 1920) deep epigastric pressure may stimulate the heart to beat in newborn children, and this indirect massage also favors respiration.

Where animation is suspended the application of the Sylvester method actually causes the diaphragm to rise with the attempt to provoke inspiration and descend with attempted expiration, thus interfering with costal respiration. Hence under this form of chest compression the content of air is reduced unless counterpressure is made by an assistant over the epigastrium at the expiration-provoking step.

In point of fact, the manipulations of cardiac massage favor respiratory movements. It is therefore unnecessary to carry on artificial respiration and cardiac massage concurrently. The bi-manual manipulation of cardiac massage involves forcible raising of the dome of the diaphragm simultaneously with compression of the front of the chest, bringing about a complete expiration. With the relief of pressure the diaphragm, aided by the weight of the liver, descends, causing deep inspiration. With cardiac massage, even before the first heart beat is excited, there is a perceptible flushing of the skin, since the manipulations supply part of the force to propel the blood stream and this artificial circulation is furthered by the intracardiac valves. From its diastolic flabbiness, the heart, under

manipulation becomes firm before the first beat, which is of minimal force. After the sixth or twelfth contraction a maximal contraction is developed. Massage should be continued until maximal automatic contractions are demonstrated by the pulse. If assistance is discontinued before a maximal force is attained the contractions again cease. In practice, only the ventricular portion of the heart is handled. If an attempt is made to include the auricular portion also the whole organ slips from the grasp and respirations become inadequate or stop.

There are four methods of performing cardiac massage: (1) Subdiaphragmatic; (2) transdiaphragmatic; (3) transpericardial; (4) supradiaphragmatic.

Subdiaphragmatic.—Make an opening in epigastrium to the left of the middle line to admit a hand. Pass the hand, palm upward, between left lobe of liver and diaphragm. Push the fingers well back and make a jabbing movement behind the ventricle so as to squeeze it against the chest where counterpressure is exerted by the other hand. The compressions should number 40 to the minute.

Transdiaphragmatic.—If the procedure just given is unsatisfactory divide the costal attachment of the diaphragm, through the incision given above, enough to force the right hand into the pleural cavity and grasp and squeeze the pericardium and contents. Here concurrent artificial respiration is required. Captain T. C. Bost, who devised the method, employed it with success after failure with method 1.

Transpericardial.—A flap of the precordial thoracic wall is raised, the pericardium is opened, and the heart squeezed directly. This is a difficult undertaking and the results have been poor.

Supradiaphragmatic.—Open rapidly a lower intercostal space on the left side. Use a long incision. Retract. Pass a hand into the pleural cavity. Grasp pericardium and contents and squeeze. If failure is met with in (1) and (2) this route and procedure may be tried. The liability to pneumothorax is reduced by the close fit of the diaphragmatic opening around the wrist. Artificial respiration can be maintained efficiently at the same time.

In conclusion the author relates the details of cases of cessation of heart movements in patients on the operating table. Cardiac massage was successful in one case after cessation of animation had continued for 10 minutes. The original operation was then resumed and occupied 2 hours. The patient made a good recovery. In another case manipulation for 3 minutes resulted in regular, forcible heart contractions and the original operation, an amputation of the thigh, was completed. The patient was returned to the ward at 4 p. m., but died at 10.28 p. m. without regaining consciousness. The other cases also proved fatal. (J. S. T.)

McKesson, E. I. *Advances in pure nitrous oxide-oxygen anesthesia, cyanosis, technic of secondary saturation.* Am. Jour. Surg. October, 1920.

McKesson maintains that complete relaxation of the abdominal muscles can safely be accomplished with nitrous oxide-oxygen anesthesia, and describes the technique by which this is accomplished. He points out the fact that preliminary, or what may be called primary, saturation with nitrous oxide is about as far as many gas-oxygen anesthetics are carried, and that if the operation requires deeper relaxation it is the practice of many anesthetists to resort to either a mixed gas-oxygen-ether or a sequence ether anesthetic, with little or no attempt to avoid the unpleasant consequences. In a primary saturation only the actively circulating blood is saturated with nitrous oxide. There remain in the muscles and in all the tissues considerable volumes of nitrogen and oxygen which in the early minutes of narcosis enter the blood stream and dilute the nitrous oxide, which prevents a deep anesthesia.

In order to displace more of the nonanesthetic gases in the body with nitrous oxide it is necessary to produce a secondary saturation which is more difficult on account of the low affinity the tissues have for nitrous oxide. In nitrous oxide anesthesia there may be sufficient anoxemia to produce muscular spasm to prevent relaxation. The author emphasizes the extreme ease and quickness of the restoration from overdose with nitrous oxide by inflating the lungs once or twice with oxygen, compared with the difficulties which follow accidental overdosage with ether or chloroform. In attempting to secure deep anesthesia and muscular relaxation it was found that cyanosis, a dilated pupil and apnea were easily corrected by inflating the lungs once or twice with oxygen, and that while these signs could not be disregarded nor neglected for a moment when they became apparent, nevertheless the patient was in no serious danger if oxygen were available and inflated into the lungs promptly after saturation had occurred.

When a patient has been reoxygenated after resaturation, complete muscular relaxation follows. The fear of cyanosis by the surgeon and the anesthetist has been one of the most powerful influences in holding back the progress of nitrous oxide and oxygen anesthesia. Cyanosis as a sign indicating the depth of anesthesia is not only absolutely valueless but misleading and dangerous, because one patient may be cyanotic and still conscious or even fighting, while another may be pink, overdosed, and dying from the same mixture of nitrous oxide and oxygen. The blood itself greatly influences cyanosis. An anemic patient requires very little oxygen to oxidize the small amount of hemoglobin he carries, while a full-blooded drayman requires a greater amount of oxygen to oxidize his greater per cent of hemoglobin. It is, therefore, obvious that the fear of cyanosis is sometimes well-founded and at other times unwarranted.

Under ether or chloroform cyanosis is usually a serious omen—an indication of serious heart embarrassment or restricted respiration from overdose or other causes. A patient will tolerate very deep cyanosis for some minutes, a moderate amount for hours, and a slight cyanosis for long periods if due merely to restriction of oxygen. The only true clinical signs of anesthesia which are of value are those manifested through the patient's muscular system. Movement or its absence is significant.

The writer divides the third stage of anesthesia into three planes—light, normal, and profound anesthesia. The profound anesthesia borders upon the fourth stage of anesthesia and the signs of this stage are the guides to secondary saturation. In the preliminary stage of nitrous oxide anesthesia 100 per cent nitrous oxide is administered to produce unconsciousness as soon as possible, by a primary saturation of the blood with the gas. When the first muscular phenomenon of oxygen hunger is observed, a small amount of oxygen (5 to 6 per cent) is given to temporarily prevent the further development of anoxemia. The per cent of oxygen is diminished and increased as the signs of anesthesia may indicate while attempting to obtain the normal plane of anesthesia. Thus the first two or more minutes of narcosis will pass before it will be determined whether the normal plane of anesthesia and relaxation can be secured without secondary saturation. The susceptibility of patients varies to a great extent. An anemic patient may only require 40 or 50 per cent nitrous oxide, while a healthy, plethoric patient may require 95 to 98 per cent nitrous oxide. If relaxation has not taken place when other signs indicate that the patient is in normal anesthesia, and if relaxation is essential to the success of the operation, see that plenty of oxygen is available and know by previous trials upon yourself that the apparatus will actually inflate the lungs with pure oxygen; then proceed with secondary saturation, as follows:

(a) *Deoxygenation*.—Reduce the proportion of the oxygen or administer 100 per cent nitrous oxide until the pupils dilate and tonic muscular spasm or rigidity develop and respirations become slow or stop.

(b) *Reoxygenation*.—Then administer one breath of 75 to 100 per cent oxygen if the patient inhales; and if he does not, partially fill the lungs by inflation with pure oxygen once or twice, usually once is sufficient. The cyanotic color now begins to lighten, the pupils retract, the pulse is normal or slower than before, the muscles become perfectly relaxed, respiration becomes regular and continuous without any phonation, and the expression on the face is that of normal sleep. If care is taken not to administer too much oxygen or too

many breaths of oxygen, which will itself desaturate, the period of relaxation may last throughout the operation or it may be necessary to resaturate if air leaks into the respiratory channels of the apparatus and thus displaces the nitrous oxide with an excess of nitrogen and oxygen in the blood. (A. L. L.)

RUBEN, J. A. **Sloughing in local anesthesia.** Penna. Med. Jour., Vol. XXIII, No. 12, September, 1920, page 713.

Sloughing of the wound edges and infiltrated areas has been the great fault found with local anesthesia. The sloughing is an aseptic death of the part, similar to a lesion produced by excessive heat or cold. The skin often blisters, as in second-degree burns, and the aseptic sloughs usually become infected.

The addition of epinephrin makes the anesthetic effect last for hours. It restricts the circulation in the anesthetized field and retains the anesthetizing fluid in the area for hours. This lowers the vitality of the tissues so that they do not withstand the trauma of rough handling.

The remedy lies in avoiding unnecessary trauma and using infiltration as little as possible. Use nerve blocking, conduction and plexus anesthesia, thus keeping the fluid away from the wound. Vary the amount of epinephrin according to the vascularity of the part, since a part rich in blood supply, such as the face, can tolerate more epinephrin than a less vascular part such as the fingers and toes. After the operation is over, apply heat, hot wet sponges, until the pale anemic skin around the operation turns to a healthy pink. (L. W. J.)

GROVE, L. W. **Local anesthesia in abdominal surgery.** Am. Jour. Surg., Vol. XXXIV, No. 9, September, 1920, page 237.

During recent years, indications and demands for local anesthesia have steadily become more and more recognized until now, in some fields of surgery, the method has approached its just recognition, and secured the adoption it deserves. In the light of our present knowledge we are justified in the statement that it is possible to perform a large amount of surgical work under local anesthesia, but we must not lose sight of the fact that a certain knowledge of technique and certain operative methods must be adhered to. Two points are absolutely essential for the execution of a satisfactory operation in the abdomen under local anesthesia. They are as follows: (1) Relaxation of mind and tissues; (2) absence of pain.

To obtain these two points technique is of greatest importance. The author's technique is as follows: When practicable, the patient is put to bed two days in advance, being given soft diet and eliminative

treatment. The day before operation he receives the usual preparation, with the exception that, save in stomach cases, liquid diet is continued until two hours before operation. One hour before operation a hypodermic injection of morphine, $\frac{1}{4}$ grain, with scopolamine, $\frac{1}{100}$ grain, is given. One-half hour later half of the above dose may be given, or not, depending on the degree of amnesia procured by the first dose. At this time the patient's eyes are bandaged and his ears stopped.

For anesthesia we have used as a routine measure procaine in two solutions; for the skin and conduction 1 per cent; for infiltration 0.25 per cent. These solutions may be used in various amounts. As much as 900 c. c. has been given and no bad results noted. In all cases the rectus incision is made, either splitting the fibers of the muscle or dislocating the belly to the outside. This is the incision of choice, because it permits of an easy and free incision, resulting in less tension on the wound edges and less traction on the mesentery, at the same time insuring good closure. Next, with a long needle, the outer edge of the rectus sheath is blocked the entire length of the incision. This is accomplished by the injection of 5 c. c. of solution in the outer edge of the rectus, at 1-inch intervals.

The peritoneum is carefully infiltrated with a small needle, as follows: A small line of wheals is produced in the peritoneum, and after a sufficient length of time—5 to 10 minutes—a small opening is made in the peritoneum. The opening is enlarged; and if the abdominal wall has been properly and completely anesthetized abdominal reflexes should be entirely suspended, and as a result when the peritoneum is opened there should be a tendency for the viscera to retract. However, if the abdominal reflexes are not entirely abolished there is a tendency for the viscera to protrude into the wound. After the abdominal cavity is opened the edge of the peritoneum is blocked with quinine and urea by the infiltration method, using 1 c. c. of solution at 1-inch intervals, 1 inch from the wound edge. The author notes that manipulation, torsion, or traction of any of the abdominal viscera nearly always produces pain. In the event of gastroenterostomy, ileosigmoidostomy, hysterectomy, etc., the attachments of such viscera will necessarily have to be blocked by the infiltration method.

The postoperative discomfort following local anesthesia compared with that from general anesthesia is practically nil. The patient reacts from morphine and scopolamine in from four to six hours, with little or no recollection of the operation. In a number of cases the patient has slept soundly throughout the operation. Except in stomach cases they have begun soft diet as soon as they reacted from the hypnotic. Vomiting, tympanites, and depression rarely occur as postoperative complications.

Local anesthesia in abdominal surgery unquestionably has its greatest field of usefulness in subacute and chronic conditions. The following factors have to be considered before this method of anesthesia is used: (1) Time is much greater than in general anesthesia; (2) need for the gentlest manipulation of tissues; (3) proper understanding of technic of local anesthesia, and the action of the drugs used; (4) a proper selection, with control of patients. It may be stated here that local anesthesia is required where a general anesthetic is contraindicated, namely, in cases of senility, cardio-renal disease, myocarditis, debility, hemorrhage. (J. J. S.)

WATKINS, T. J. **Treatment of suppurating wounds following abdominal section.** Surg., Gynec., and Obst., Vol. XXXII, No. 1, January, 1921, page 87.

Watkins uses wet dressings (boric acid solution) in the treatment of infected wounds following operation. No sutures are removed until the wound is healed unless it becomes necessary on account of excessive cutting of the sutures into the tissues; no drainage is inserted; no probing is permitted. Moist dressings are kept continuously over the wound as long as it remains reddened or indurated. The value of moist dressings consists almost entirely in preventing dessication of the secretions and thus favoring drainage. Chlorinated solutions may be used in wounds which contain considerable necrotic tissue.

Drains are not necessary as the wound will drain sufficiently without them. They quite as often interfere with as promote drainage. The experience is common that considerable discharge takes place after the so-called drain is removed, which is proof that it has been obstructing drainage. (L. W. J.)

ROYSTER, H. A. **Saving suppurating incisions.** Surg., Gynec., and Obst., Vol. XXXII, No. 1, January, 1920, page 90.

When drainage is needed it becomes a matter of great economic value to use stab wounds outside the incision rather than to place a drain through the incision. When this is done in 8 out of every 10 cases the wound is kept intact, heals perfectly, and drainage is efficient and safe.

In some of the doubtful cases, in which the abdomen is closed, the wound suppurates though the abdominal cavity remains free from infection. It is well known that the resisting power of the tissues of the abdominal wall is not so strong as that of the peritoneum. One is not surprised, therefore, when a leaky appendix is smeared over the open wound or a tight one ruptures in lifting it out, to ob-

serve a swollen and tender area around the incision 4 or 5 days later. As a rule the focus of this infection is under the aponeurosis and within the fibers of the internal oblique muscle.

As soon as the condition is recognized a small spot of skin at the most prominent part is injected with a local anesthetic and a bistoury plunged deeply downward and inward. Through this small stab the pus is evacuated. When the small space is emptied a quantity, equal to the amount of pus removed, of a 10 per cent melted iodoform-vaseline ointment is introduced by means of a glass syringe. This distends the cavity, fills the interstices and solidifies on cooling. A cold, wet compress is immediately applied over the whole area. As a rule, the dressing is not disturbed for 4 days, when, on removing the dressing, the incision and the suppurating area will be found clean and intact. If the discharge recurs, the procedure may be repeated. (L. W. J.)

FUNK, V. A. **Abdominal adhesions.** Am. Jour. Surg., Vol. XXXIV, No. 9, September, 1920, page 240.

At first thought we consider these as undesirable attachments, following some irritation. This is an erroneous conclusion, for adhesions in the abdominal cavity are far oftener friendly than otherwise. It is the readiness with which peritoneal surfaces unite and permanently adhere about the suture lines that makes possible the various surgical anastomoses of the gastrointestinal tract. This same adhesive tendency seals the averted peritoneal surfaces of all laparotomy incisions, providing the surgeon is painstaking enough to close them in a proper manner. This same adhesive force has also performed its duty when we encounter the localized abdominal and pelvic abscesses. These adhesions, however, tend to disappear when the infection or irritation has disappeared, and these temporary adhesions are the most numerous. If the infective process is of too long duration the adhesive wall may become a permanent adhesion.

The most fruitful source of adhesions from violence is the manipulation of the abdominal viscera by the surgeon. Many of these injuries cause adhesions of only a temporary type, but far too many of them are so severe that permanent adhesions result. Free blood and clots lying on uninjured peritoneum seem to be absorbed without the formation of adhesions, but if they lie in contact with injured or raw surfaces they have a tendency to increase the amount of adhesive formation at that place.

We must not overlook the individuals who have an excessive predisposition or an idiosyncrasy to the production of adhesions. In these patients the simple opening of the abdomen for some very

slight operation with no packing off of the viscera and practically no handling of the peritoneal surface many adhesions will be formed, and these are usually of a permanent type.

The best way to diagnose adhesions of the abdominal viscera is through the pneumoperitoneum technic. By inflating the abdominal cavity with oxygen and taking X-rays laterally we can show any adhesions and any attachments of the organs to the anterior wall.

When an adhesion causes pain it must limit the mobility of a hollow organ. Pain by adventitious bands is unusual unless the function is disturbed. Narrow bands are most usually the cause of the trouble. They slowly obstruct or angulate an organ or form a sling over which the organ may fall, causing an acute angle of its lumen and an acute obstruction, either partial or acute.

The most important treatment of adhesions is their prevention. Our efforts must be directed not against the adhesions but against the factors producing them. When an adhesion exerts a pernicious influence there is but one thing to do, and that is to operate. The band must be severed and the raw surfaces covered so as to prevent re-formation. (L. W. J.)

FARR, C. E. **Perforating gastric and duodenal ulcer.** Ann. Surg., Vol. LXXII, No. 5, November, 1920, page 591.

Farr reports 24 cases operated upon with 3 deaths. The duration of symptoms was within 24 hours except in two cases, both of which died. Infolding mattress sutures of chromic gut in two layers were used exclusively. Posterior gastroenterostomy was done but once.

The diagnosis of acute perforation of the stomach or duodenum is remarkably easy except in the complicated cases. Acute perforations of the gall-bladder, acute pancreatitis, and high-lying perforated appendicitis may give symptoms suggestive of stomach perforation, but there is not the sudden onset of agonizing pain or the boardlike rigidity in the first few hours.

The treatment of acute perforation is obvious and is easily carried out in most cases. A simple high laparotomy and suture of the opening can be done in a few minutes. The only question is whether a gastroenterostomy should be added. Deaver urges that this be done in all cases. Conners is just as strongly opposed. Many others take a middle ground, doing the gastroenterostomy in cases seen early and without peritonitis.

The argument for gastroenterostomy is that it aids in healing the ulcer and prevents stenosis. On the other hand, most perforating ulcers heal promptly after closure, and reperforation, hemorrhage, and stenosis are exceptional. The strongest arguments against the added operation are the increase in the immediate mortality and the

fact that the end results of gastroenterostomy, even in the best clinics, are not uniformly good. When one considers that the great majority of these acute perforations will be operated upon by surgeons of only moderate skill and experience in gastric surgery, it would seem the part of wisdom to do the simple life-saving operation and await the result, with a later gastroenterostomy for the small percentage of those requiring it. (L. W. J.)

LEWISOHN, R. Persistence of pyloric and duodenal ulcers following simple suture of an acute perforation. *Ann. Surg.*, Vol. LXXII, No. 5, November, 1920, page 595.

There is a prevalent idea that an acute perforation of an ulcer of the stomach or duodenum will result in the spontaneous disappearance of the ulcer. For this reason many surgeons claim that all that is necessary in a case of acute perforation is simple closure of the perforation in order to prevent leakage of gastrointestinal contents. They consider gastroenterostomy as an unnecessary, rather dangerous procedure in these cases.

The main points that have been dwelt upon by the opponents of immediate gastroenterostomy are the spreading of infection and the undue lengthening of the operation. The spreading of infection is a more or less theoretical objection. If the perforation has occurred into the free peritoneal cavity, the whole peritoneum is already infected and the gastroenterostomy does not spread the infection. If the peritonitis is localized and walled off, the rest of the peritoneal cavity can be safely protected by packing. A gastroenterostomy can be done so rapidly that the small loss of time will not play any rôle in the operative end results. The Murphy button ought to be used in cases of acute perforation, as this method requires less time than a suture gastroenterostomy.

The great advantage of an immediate gastroenterostomy, especially if combined with pyloric exclusion, is based on the fact that the post-operative feeding is considerably simplified. The main advantage is the curative effect on the ulcer. There can be no doubt that simple closure will fail to cure the ulcer in a large number of cases. (L. W. J.)

COLE, L. G., and ROBERTS, D. Diverticula of the duodenum. *Surg., Gynec., and Obst.*, Vol. XXXI, No. 4, October, 1920, page 376.

The frequency and importance of diverticulosis of the alimentary tract has escaped attention until recent years. Colonic diverticula are of common occurrence, but diverticula of the small intestine are still regarded as rarities. Our ideas of their frequency must be revised because the duodenal diverticula are so frequently found in the course of routine radiographic examinations.

The most common situation of these pouches is the second portion of the duodenum, close to the ampulla of Vater. Usually they spring from the inner and posterior aspect of the gut and lie in close contact with the pancreas. They are usually single but there may be as many as three or four. They vary in size from 1 to 4 cm. in the large diameter, from the size of a pea to a small pear. Occasionally they have been found to contain food remnants even when the stomach and duodenum were entirely empty. The mucosa and submucosa are normally present but the musculature lacking. Bits of pancreatic tissue are frequently found in the mucosa of the diverticulum.

Of the 30 cases observed by Cole and Roberts, 4 were associated with doubtful evidence of duodenal ulcer, 3 with evidence of gastric ulcer, 11 with pylorospasm. The characteristic X-ray finding is a localized accumulation of the opaque meal adjacent to the duodenum. This may be as small as a grape seed or as large as a hen's egg.

Diverticula must be differential skiagraphically from other pathological conditions which fall into two groups. Group 1 includes those in which the Roentgen findings occur before the ingestion of the opaque meal and are caused by conditions such as renal calculi, gallstones, calcified glands, fecaliths, and pancreatic calculi. Group 2 includes those pathological processes in the gastrointestinal tract which may be visualized by an opaque meal, such as ulcers, gall-bladder fistulas, and isolated collections of opaque meal. (L. W. J.)

HARRIGAN, A. H., and BOORSTEIN, S. W. **Orthopedic treatment of burns.** *Ann. Surg.*, Vol. LXXII, No. 5, November, 1920, page 616.

The orthopedic surgeon by applying the braces or plaster casts commonly used in the treatment of anterior poliomyelitis may prevent the contractures following severe burns.

In burns of the neck a collar is applied to maintain the head in the middle line, with the chin up. The collar is made of felt about three-fourths of an inch in thickness. This is covered with soft felt or muslin. It can be removed for dressing.

In burns of the shoulder and axilla, which frequently result in severe contractions, the arm must be kept in extreme abduction. The hand is tied to the head of the bed, which is elevated, so that the weight of the body tends to maintain the abduction. In cases of burns at the elbow, extension of the arm is maintained by securing the wrist to the side of the bed and the body to the opposite side by means of folded sheets passed round the chest at the nipple.

In burns of the wrist and fingers it is important to keep the adjacent raw surfaces separated. This may be done by encasing the fingers in oiled silk and applying a partial plaster cast.

If scar tissue is beginning to form or already present, the limb may be returned to the normal position by gradual stretching.

Early massage, exercises, and wearing braces help in maintaining proper position. (L. W. J.)

SILK, J. F. W. Chill as a direct cause of post-operative bronchial irritation. *Am. Jour. Surg.*, Vol. XXXIV, No. 11, November, 1920, page 280.

During the war Colonel Silk was employed in visiting the principal war hospitals in the United Kingdom and paid at least a thousand visits to the different hospitals, so that unusual opportunities were afforded him for studying this subject.

He believes that defective ventilation plays a much more important part in the production of these troubles than mere chilling.

The peculiar incident of these troubles was puzzling, for whilst the complaints from certain hospitals might be very emphatic, it sometimes happened that they occurred chiefly in the practice of certain surgeons, and quite frequently the staffs of the other hospitals in the immediate neighborhood reported no troubles of this nature. The bronchial troubles were also found to be associated with operation headaches among the staff.

Alterations which produced better ventilation were found to reduce the incidence of bronchial irritation. (L. W. J.)

KELLOGG, J. H. Safety methods in the care of surgical patients. *Am. Jour. Surg.*, Vol. XXXIV, No. 10, October, 1920, page 261.

First of all, the patient is subjected to a thorough physical examination after the clinical history is taken. This includes, in addition to routine methods, a fluoroscopic examination of the chest; a blood count, estimation of hemoglobin and differential count of leucocytes; a chemical examination of the blood for nonprotein nitrogen, uric acid, and sugar; a Wassermann test; examination of the heart and blood vessels and determination of the diastolic and systolic pressure; bacteriological examination of the blood; a quantitative examination of the urine, including a determination of the total nitrogen and the ammonia content, of indican and other conjugate sulphates and of the acidity by the hydrogen-ion method; determination of the urinary efficiency by the phenolphthalein test; determination of the CO₂ tension of the residual air with reference to acidosis; careful examination of the nose, throat, mouth, and teeth with reference to focal infection; determination of the motility of the alimentary canal by means of the charcoal or carmine test, and, in cases of abdominal operations, a barium meal and X-ray examination of the entire alimentary canal. An electrocardiographic tracing is made together with a careful study of the heart in relation to myocarditis or other

grave organic changes, and a determination of the heart efficiency and vascular tone by means of exercise and posture tests.

Various means are used to increase general vital resistance. Short cold applications have a powerful tonic effect on the heart. They also quicken and deepen the respiratory movements. The chest is more fully expanded than usual, residual air is driven out, and the volume of tidal air increased. The increase of white cells may amount to 300 per cent within half an hour after the cold application. The alkalinity of the blood is also increased.

One of the most important things to be done in the preparation of a patient for a severe surgical operation is to change the intestinal flora. Many means have been suggested but the simplest is the employment of a fruit regimen for a few days. This consists of fresh fruit combined with bran or agar with the addition of milk sugar and paraffin oil. When the hemoglobin is low purees of greens are added. After three or four days of this the tongue clears and the stools lose their putrid odor.

It is most important that the liver be in as fine condition as possible before the operation. To accomplish this it is important that the patient's diet should be rich in carbohydrates, at least 16 ounces daily, and during two or three days before the operation it is well to give 8 or 10 ounces of malt or milk sugar daily in addition to the regular meals.

If the CO_2 tension is found to be less than 34, the body's store of glycogen must be replenished by carbohydrate feeding or enemas.

In all cases, but especially when the abdomen is to be opened, particular attention is given to the colon. The fact that the bowels move once a day is no evidence that the colon is being promptly emptied. The motility of the intestines may be determined by giving a couple of carmine capsules at breakfast and noting the time of appearance of the red in the stools. The time of disappearance is also noted. The color should appear in 10 to 14 hours and disappear, at the longest, in 26 hours.

The preparation of the bowels immediately before the operation is a matter of great importance. Kellogg believes that the use of laxative drugs is highly detrimental. They should be carefully avoided in the preparation of the patient for the operating table. A warm enema will suffice to empty the colon unless mechanical obstruction exists. There is less likely to be difficulty with gas when laxatives are not used, for these cause spastic contraction of the descending colon and greatly exaggerate antiperistalsis.

During the days immediately preceding the operation the patient is required to drink 3 to 5 pints of water daily in addition to the amount taken with the meals.

As soon as the anesthetic is begun a cold compress is applied to the chest. This is changed every 5 minutes during the operation. The nurse who assists the anesthetist attends to the compress and takes care to rub the chest vigorously with a dry flannel cloth each time the compress is changed. The cold compress prevents the stasis in the lung circulation which follows from the anesthetic. Pneumonia and dangerous heart weakness are very likely to follow the operation when very pronounced cyanosis occurs.

Every possible means is employed to lessen traumatism. The incision is no larger than necessary. The edges of the wound are protected from bruising. Pointed instead of broad forceps are used for picking up arteries and the arteries are tied at once. Intestines and other parts are manipulated as little as possible. Instead of gauze napkins, padded napkins covered with Chinese silk and oiled with paraffin are used for walling off the intestine.

The blood pressure is taken just before the operation and every five minutes during the operation. Each reading is recorded, as soon as taken, in large figures on a placard placed so as to be easily seen by the surgeon. If there is any considerable drop in the pressure, Ringer's solution is introduced by infusion or intravenously in sufficient quantity to bring the pressure back to normal.

The postoperative care is greatly simplified by the proper preoperative preparation. As soon as the patient reaches his room he is placed in a warm pack which should extend from the feet to the hips or even to the shoulders. Hot applications may be made either with a blanket wrung out of hot water, a large fomentation applied to each leg and the back and hips separately, or the electric blanket. As soon as the skin is well warmed, a cold towel rub or mitten friction is applied to the entire surface of the body not covered by the dressing. This not only energizes the heart and raises the blood pressure but stimulates the peripheral blood vessels, thus directly combating shock. Within an hour or two after the operation a copious enema is administered for the purpose of promoting peristalsis. The temperature should be 85 to 90 F. The efficiency of the enema may be increased by adding malt sugar or milk sugar in the proportion of about 10 per cent. This combats acidosis and shock. The sugar water enema is repeated, about a pint every three hours, for several days, the patient being allowed to retain as much as he will.

The first night after the operation the patient is given a carmine capsule and a little later a dose of mineral oil. These indicate the intestinal mobility. When they appear in quantity there can be no serious obstruction. If the patient suffers from vomiting on the third day after operation, and the carmine has not made its appearance in quantity, an X-ray examination is made. The outline of the distended, gas-filled intestines which coexist with obstruction

may be recognized by the X-ray without the necessity of administering barium. It is possible, by this means, to discover the presence of obstruction and determine the probable location long before any other positive indications are obtainable.

Feeding should be begun as soon as possible after operation. This lessens the danger of exhaustion and prevents the hunger pains and violent contractions of the stomach. Bland food is often more effective than any anodyne in controlling the pain following operations on the gall-bladder or stomach.

Nausea and vomiting increase the tendency to acidosis. Washing out the stomach after ether anesthesia and a hot bag applied to the stomach are very effective in controlling post-operative nausea and vomiting.

An abundant supply of water is essential after every serious operation. A half pint every hour is the usual amount, by mouth if there is no vomiting, by both mouth and rectum if there is nausea and vomiting.

On the second day exercises in bed are begun. These consist of deep breathing and flexing the fingers and toes. From day to day the exercises are increased so as finally to include arm and leg flexing, arm and leg raising, and turning in bed. (L. W. J.)

HOLMAN, E. End-to-end anastomosis of the intestine by presection sutures. Bull. Johns Hopkins Hosp., Vol. XXXI, No. 355, September, 1920, page 300.

The procedure employed is as follows: The two points of proposed division of the bowel are selected, preferably where the vessels of supply are easily seen. The loop to be resected is milked free of intestinal contents and rubber-covered clamps are applied very gently and with just sufficient pressure to prevent the passage of intestinal contents. The clamps are applied on each side of the two lines of division and about one inch from the line of division.

The loop arteries paralleling the bowel are ligated at points exactly opposite the proposed lines of division. The first row of sutures is then applied one-quarter to three-sixteenths inch from the proposed line of division, the first suture being applied at the mesenteric border and the last on the opposite side also at the mesenteric border. The sutures are applied at right angles to the lumen of the bowel and parallel to the larger vessels coursing over the intestine. They include about one-eighth inch of bowel wall and a bit of the submucosa and are placed about three-sixteenths inch apart until the whole bowel has been surrounded by a line of interrupted sutures. A second row of sutures is taken paralleling the first line and only one-sixteenth inch from the line of proposed division.

32388—21—13

These sutures are placed exactly opposite the intervals between the sutures of the first line, thus insuring against any leakage between the interrupted sutures.

Two similar rows of sutures are applied at the second line of proposed incision, the number of sutures corresponding exactly to the number of sutures in the first row.

The main arteries to the loop of intestine to be resected are then ligated and divided. The bowel is divided as closely as possible to the lines of sutures and the intervening portion excised.

The lines of sutures nearest the ends of the bowel are then tied, the two strands of each suture being held and tied as a single thread, each knot being made up of four strands of silk. This first line of sutures gives an accurate approximation of the mucosa. The second lines of sutures are tied in similar fashion. These sutures give an approximation of the serosa around the entire circumference of the bowel, and at the mesenteric border the two adjoining sutures at the opposite sides, overlapping, insure an adequate inturn and firm closure at this important point. The rent in the mesentery is closed with continuous or interrupted black silk sutures, care being taken not to include any of the vessels supplying the loops of intestine.

All sutures are applied before incision into the bowl, avoiding sepsis and facilitating the introduction of the sutures. The sutures are applied at right angles to the line of division, so none of the larger vessels are constricted. There is a minimum of trauma such as accompanies the use of mechanical devices or the handling of the bowel edges with forceps. (L. W. J.)

BARNEY, J. D. Genital tuberculosis in the male. *Am. Jour. Surg.* December, 1920.

The following propositions are laid down: (1) The epididymis is the primary focus in the genital tract, but (2) this is always secondary to a focus elsewhere in the body, this focus being situated most often in the lung. (3) The prostate and seminal vesicles are invaded by the disease early and often, but after removal of the epididymis clinical cure is finally established. (4) The second epididymis becomes involved in at least half the cases, but involvement of this organ may be obviated by early resection of its vas deferens. (5) Orchidectomy is unnecessary if the testicle is free from disease, and even if affected the diseased portion can be successfully removed in many instances.

The author holds that primary tuberculosis of the prostate is a rarity. Tuberculosis of the genital tract is most uncommon in children. Continued observation convinces the author that even

when prostate and vesicles are indurated and tuberculous a clinical cure can be obtained by removal of the epididymis.

Diagnosing tuberculosis of the epididymis is often difficult, and it should be remembered that tuberculosis may invade the epididymis even during an attack of gonorrhea. Chronic or subacute inflammation of the epididymis may be excited by the tubercle bacillus, the gonococcus, and the colon bacillus or by pyogenic organisms.

When the epididymis is obviously diseased and palliative measures do not improve the condition in a reasonable time operation should be resorted to. This need be only an exploratory incision with removal of a specimen of tissue for microscopic examination. Two clinical cases are described in which tuberculosis of the epididymis was diagnosed when the real malady was sarcoma.

It is best not to operate on cases in which renal and pulmonary involvement are present. Sanatorium and tuberculin treatment are the safe lines to follow here.

The author gives in detail the procedure for removal of the epididymis and closes his paper with an urgent appeal for conscientious observation and care of cases after operation, including the use of tuberculin. (J. S. T.)

KOLISCHER, G. Radium therapy of cancer of bladder and prostate. *Am. Jour. Surg.*, December, 1920.

The knife is unsatisfactory in dealing with malignancy of bladder and prostate, but radioactive substances have both palliative and curative properties. No mortality and the absence of serious pain after their use are further recommendations.

"It is known at the present time that in any object that is exposed to rays another system or complex of secondary rays is set up, the character of these secondary rays depending not only upon the nature of the primary source of the rays but also upon the material that is interposed between the source of the rays and the object to be rayed—in other words, it depends on the filter employed in order to ward off the soft rays and permitting only the hard ones to reach the organ or tumor in question. This fact explains that in some instances even at a remote date changes may occur produced by secondary rays also in organs quite distant from the tumor that was meant to be treated by rays. Heavy zinc and lead filters have proven to be particularly prone to produce such untoward results, among which perforation of a bowel may be quoted as one of the most dangerous accidents."

Gold is the best material for filters for bladder work. They do not have to be thick, and that means ease of introduction.

"As to the time of radium application we distinguish between primary application, raying following electrocoagulation of the tumor,

and prophylactic raying secondary to the excision of the growth. The time of the primary introduction of radium into the bladder will depend on the condition of the viscus." Preliminary treatment is required if there is much change in the bladder. This reduces inconvenience to the patient or increases the operator's control of radium activity and his interpretation thereof. Ammoniacal urine calls for the installation of small quantities of 1-5,000 pyoktanin solution, followed later by 10 per cent iodoform-oil emulsion. When the cystitis clears up begin radium treatment. In other cases begin the preparatory treatment with the iodoform-oil emulsion.

Where hematuria is frequent and abundant 1-1,000 silver nitrate solution is used for irrigation. If the bladder walls are so extensively infiltrated that its power to retain fluids is very markedly reduced the case is not one for primary radium treatment. Such a case demands suprapubic cystotomy, electrocoagulation of parts of the growth within reach and then radium treatment, the latter hastening the detachment of the eschar produced by diathermy.

"Prophylactic treatment after the excision of tumors of the bladder is started as soon as the first wound reaction has subsided. The application of radium to prostatic cancers is conducted on the same principle." When the pain of prostatic cancer due to capsular tension is not promptly relieved by radium, suprapubic cystotomy and electrocoagulation of the tumor is indicated.

Cystoscopic appliances aiming to keep the radium container on a definite spot and keeping it there are painful and do not accomplish the purpose. If radium is capable of doing good at all it will be effective even if only a part of the tumor is exposed. Contractions of the bladder wall sooner or later cause any portion of it to crawl from under such an object pressing upon it.

To carry radium into the unopened bladder the author uses a silver sound with a detachable hollow gold tip holding the glass container for the radioactive substance. The caliber of the sound is 21 Charrière. The handle of the sound is to be protected from pressure of the bedclothes by a crate. It is rarely necessary to fasten the instrument in place. Frequent micturition is encouraged. If it does not take place along the shaft of the instrument this must be removed at frequent intervals.

If a gold filter is not available, the capsule can be wrapped in pure rubber to prevent secondary irradiation. The container stays in the bladder 24 hours and the treatments are made once a week, the intervals being used for antiseptic treatment of the bladder. Besides the filter the mucous membrane must be protected so that even the gamma rays will only impinge on the area corresponding to the prostatic surface facing the anterior rectal wall. "For this purpose a heavy lead cup is slipped over the filtering capsule. In this cup a

little fenestra is cut; the container is then placed into the rectum in such a way that this opening lies against the prostate, while the balance of the rectal ampulla is entirely screened off. In order to maintain the capsule in this position it is connected with a stiff rod that carries a curved adjustable crossbar."

The injection of proteids into the prostate seems to enhance radioactivity very distinctly. A proteus enzyme prepared by Kendall's method is used.

Injury to the mucosa from radium shows first by small blisters and extreme irritability of the bladder.

"In a general way, it may be said that if a few radium treatments do not produce decided improvement continuance is hopeless and we have to resort to electrocoagulation."

Fifty milligrams of radium or mesothorium suffice for use on vesical or prostatic tumors. (J. S. T.)

MORSON, C. Radium in treatment of malignant disease of the bladder and male genital organs. *Brit. Jour. Surg.*, Vol. VIII, No. 29. July, 1920, page 36.

Definite degenerative changes are produced in the cells of the normal tissues of the mucous membrane and skin when exposed to radium irradiation. The pinkish color of the mucous membrane is changed to a grayish hue, not unlike that seen in the early stages of leukoplakia. Gradually a film of this gray color forms, which finally separates, leaving a shallow ulcer. This ulcer is tender, painful, and heals slowly. Microscopic examination shows that the superficial cells have undergone keratinization.

When sepsis arises in the course of radium treatment the natural resistance of the patient disappears and the spread of the disease is rapid. The sensitiveness of the malignant cell to the action of the rays is in direct proportion to its reproductive power. Bacteria are not destroyed by the gamma rays of radium unless the exposure be very prolonged. Prolonged exposure leads to the complete disintegration of the leucocytes. The lymphocytes are most readily destroyed. Thus the action of radium in destroying bacteria is neutralized by the harm it does to the leucocyte. The spread of a growth is hastened by radium irradiation if sepsis is introduced.

Morson believes that the best way of applying radium to malignant growths of the bladder is by performing a suprapubic cystotomy and burying the radium in the growth. The removal of a growth by radium does not insure an immunity from recurrence in other parts of the body. It is the type of growth that rarely gives rise to metastasis that is most successfully treated by radium. (L. W. J.)

BLOODGOOD, J. C. **Bone tumors.** Am. Jour. Surg., Vol. XXXIV, No. 9, September, 1920, page 229.

True sarcoma of bone, whether periosteal or central, is rarely cured by operation. The failure to cure is due to early metastasis to the lung. In periosteal sarcoma the duration of life after operation is usually less than 18 months.

Sarcoma of bone is one of the most malignant types of tumor. Immediate employment of the X-rays for diagnosis is important. It should be resorted to before instituting any treatment. In view of the fact that few cures are accomplished by amputation for true sarcoma of bone and of the fact that many periosteal and central lesions which may resemble the true sarcoma in the roentgenograms are benign, or relatively so, amputation should never be performed until the diagnosis of malignancy is established. In many cases an exploratory incision will be necessary to establish this diagnosis.

Amputation without positive diagnosis of true sarcoma is not justifiable. In a few cases of periosteal sarcoma the X-ray is so distinctive that the diagnosis can be made from this alone and amputation can be done if the lungs show no metastasis. This should be the operation of choice in true periosteal sarcoma of the femur and upper end of the tibia, because resection with bone transplantation rarely gives such a serviceable limb as the artificial.

In true sarcoma of the periosteal type in the lower portion of the tibia and fibula which is well localized, resection—giving the disease a wide margin—and transplantation should be the operation of choice. In periosteal sarcoma of the upper extremity where local resection and bone transplantation are ruled out because of local growth, it is a question whether Coley's serum and X-ray or radium should not be tried first, for the loss of an arm is so great a mutilation and the possibility of cure so remote. Bloodgood has no record of a case of a true periosteal sarcoma of the upper extremity cured by amputation.

In central lesions amputation should never be performed without an exploratory incision. No mutilating operation should be performed for a bone lesion of either extremity without a positive diagnosis, and one should never hesitate to make an exploratory incision for careful inspection of the gross appearance and microscopical study. If the surgeon is not prepared to act himself on this diagnosis the wound can be disinfected with the cautery, pure phenol and alcohol, or a 50 per cent solution of zinc chloride, and the tissue sent to a competent diagnostician for advice.

Bone and joint lesions, even when multiple, may be primary in their origin and have no relation to readily demonstrable focal infection in the tonsils, sinuses, or teeth, and precious time has been lost

in some cases because the vision of the diagnostician has been obscured by the tremendous discussion on this subject.

The most important examinations are those of the involved area and the chest by the X-rays. It is also important to examine the other bones because the demonstration of multiple foci practically excludes sarcoma. The next most important step is the Wassermann reaction, then the test of the urine for Bence-Jones bodies. The demonstration of the latter favors multiple myeloma.

The palpation of a tumor is not always distinctive. Syphilitic periostitis can not be distinguished from periosteal sarcoma by palpation. The palpation of the shell of bone in central lesions is not diagnostic, nor is the complete or partial destruction of the bony shell a positive sign of malignancy. This destruction of the shell may be present in the giant-cell tumor, which may have all the appearance of a most malignant sarcoma.

The most frequent symptom of onset in the benign bone cyst is a pathological fracture. This has never been observed as the symptom of onset in the central giant-cell tumor, the central sarcoma or the periosteal sarcoma. Pain is rarely absent in periosteal sarcoma. Careful study of the symptom of onset and the sequence of symptoms shows nothing particularly helpful in the diagnosis except that, if the patient falls, sustains a fracture and the X-ray shows a central lesion, and there have been no symptoms previous to this, and the patient's age is under 21, with few exceptions, we are dealing with a benign bone cyst.

Many mistakes in diagnosis are made by experienced roentgenologists. In some cases of periosteal sarcoma the picture is so characteristic that a positive diagnosis can be made. In other cases, however, the shadow of the periosteal lesion and of the bone destruction is atypical and many mistakes are made. The most common mistake is the diagnosis as a chronic osteomyelitis of a lesion which later proved to be a periosteal sarcoma. Less frequently syphilitic periostitis has been diagnosed periosteal sarcoma. More mistakes are made in the diagnosis of central lesions. There is too large an element of error to allow the differential diagnosis to rest on the X-ray alone.

An X-ray of the chest showing metastasis is of great importance in the diagnosis of malignancy, but a negative picture does not exclude malignancy. When the X-ray shows lesions in other bones this practically excludes primary central or periosteal sarcoma as these do not metastasize to other bones but to the chest. Multiple periosteal lesions of a type different from the exostoses but resembling a periosteal sarcoma are due to syphilis. A positive Wassermann reaction does not exclude a nonsyphilitic bone lesion, but salvarsan intravenously will show within 10 days a definite change in the syphilitic lesion. (L. W. J.)

BAKER, R. H. Compression fracture of the vertebral bodies with delayed symptoms (Kuemmel's Disease). *Surg. Gynec. and Obst.*, Vol. XXXI, No. 4, October, 1920, page 359.

In 1895 Kuemmel presented five cases of this type of spinal lesion, with a discussion of the characteristic symptoms. The injury was usually the result of a fall. The essential features at the first observation were pain, more or less localized over some point in the spine, limitation of motion of the type seen in muscular injury, and a disability period lasting perhaps but a few days. The subsequent history characterizes the type of lesion. At a later period, varying from weeks to months, without a second injury, the patient develops pain in the back at the site of the former pain with increasing disability. On examination there will be found a localized tenderness over the spinous processes at the point of previous injury, with more or less marked local prominence of one of the spinous processes. This latter marks a point about which there is some limitation of motion.

Since the first description the same type of lesion has been occasionally mentioned, but not until the X-ray had been developed were we able to check this syndrome with the actual organic lesion which seems to be the basis of all these cases.

Baker presents the theory that there is a type of compression fracture of the spinal bodies which is apparently benign at first and gives no X-ray evidence of a bony lesion, but in which, at some later period, definite bony changes develop, and the diagnosis can be easily made by certain distinctive signs.

The prognosis of the condition is good if diagnosis is made and treatment is begun early. The treatment is adequate fixation over an extended period. Some have advocated bone grafting and used it with good results.

A typical case history follows: While on duty in France a soldier jumped into a shell hole and felt a sudden pain in the back. He felt at first that he was paralyzed in both legs. After several hours he was able to crawl back. After eight days in the hospital he was sent to convalescent camp. Five and one-half months later, examination showed a kyphos at the level of the eleventh dorsal vertebra, tender on pressure. Spinal motion was limited for several segments above and below this point, but there was no distinct muscle spasm. X-ray examination revealed a compression fracture of the body of the eleventh dorsal vertebra.

Conclusions.—Compression fracture of the spinal bodies without cord symptoms is frequently undiagnosed, or incorrectly diagnosed at the time of injury. A negative X-ray finding at the time of injury is not proof positive against fracture. Symptoms referable to the fracture may not occur for some time after injury. At this later

period the signs and X-ray indicate a compression fracture of the spinal bodies. (L. W. J.)

HEUER, G. J., PRATT, G. P., and MASON, V. R. Penetrating wounds of the chest. Ann. Surg., Vol. LXXII, No. 3, September, 1920, page 352.

Evacuation Hospital No. 1 began its activities with a fairly definite routine in the treatment of thoracic injuries; namely, to treat expectantly or medically the through-and-through wounds without open pneumothorax or extensive rib fractures, and the penetrating bullet and small shell wounds of similar character; and to operate as soon as possible upon (a) those with open sucking pneumothorax, at the time of the primary operation removing foreign bodies, controlling hemorrhage, and suturing or resecting the lung when indicated; (b) those with an acute continuous hemorrhage threatening life; (c) those with large intrapleural or intrapulmonary foreign bodies; and (d) those with extensive rib fractures.

Among the cases not primarily operated upon, cough, hemoptysis and dyspnea were common and would appear to occur almost invariably when the pleura and lung are penetrated. Acute primary hemorrhage threatening life was not seen in this series; secondary hemorrhage occurred in two cases. Mediastinal compression symptoms (dyspnea, tachycardia, cyanosis) due to a high grade of pneumothorax were noted in 12 cases, but in none were they so urgent as to require immediate operation for their relief. Extensive subcutaneous emphysema was present in 12 cases, a slight degree in many cases. Pure hemothorax occurred in 94 of the 115 cases, or 81 per cent. Collapse of the lung was seen in only one case. Mild abdominal signs and symptoms were rather common in the low thoracic injuries.

Infected hemothorax, the most frequent complication of penetrating thoracic wounds, occurred in 18 (17 per cent) of the cases which survived the immediate effects of their injuries. The predominating infecting organisms were the gas bacillus of Welch, the *Streptococcus hemolyticus*, the *Streptococcus viridans*, and the *pyogenic staphylococci*.

Pneumonia occurred in two forms, as a septic broncho-pneumonia occurring about the seat of the lesions, or as a lobular or lobar pneumonia. By autopsy pneumonia was demonstrated in seven cases, four of which were associated with infected hemothorax.

Secondary or late intrapleural hemorrhage occurred in two instances, one on the sixth and one on the tenth days.

The treatment in the cases not primarily operated on was absolute rest in bed and morphia in sufficient doses to induce quiet. Shock was immediately and energetically treated. In the lesser

degrees of shock, blood transfusion, intravenous gum acacia (Bayliss' solution), intravenous saline, hypodermoclysis, and salt and coffee per rectum, together with elevation or bandaging of the extremities, were used. The profoundly shocked did not respond to the various methods, excepting to blood transfusion when hemorrhage was the cause of the shock. Their experience is summarized as follows: (*a*) Marked beneficial effects follow the use of external heat, rest, and morphia in the lesser degrees of shock; (*b*) blood transfusion is of the greatest value when hemorrhage is the cause of the shock; (*c*) in profound shock of long duration treatment had little effect; (*d*) in the lesser degrees of shock intravenous saline or salt and coffee had about as marked an effect upon the pulse and blood pressure as did gum acacia.

Treatment of the 18 cases developing infected hemothorax consisted in rib resection and drainage so soon as the diagnosis was established by cultures of the aspirated fluid. Operation was followed by sterilization of the pleural cavity by Dakin's solution; with subsequent excision and closure of the sinus so soon as the cavity was sterile.

In the 45 cases subjected to immediate operation, cough, hemoptysis, and dyspnea were more troublesome in those with open sucking wounds than in those with closed wounds. While in the latter, cough can be controlled by sedatives, in the former, it can not be satisfactorily checked until the thoracic wound is closed. Dyspnea was invariable in the open wounds, was sometimes most distressing, and was always accompanied by some degree of cyanosis. It persists so long as the thorax is open and tends to become progressively worse.

Abdominal signs were noted in eight cases and in all of them the operation showed perforation of the diaphragm.

The operative procedures divided themselves into three more or less distinct groups. The simplest procedure was excision or debridement of the wound of the soft parts and the removal of bone fragments. The second consisted of debridement of the wounds, an exploratory thoracotomy, the evacuation of the blood in the thorax, debridement and suture of the wound of the lung when practicable, and the removal of foreign bodies when possible. The pleura was closed but the overlying muscles and skin were left open because of the danger of infection. The third procedure consisted in the careful excision or debridement of the wound, the careful removal of all bone fragments from the pleura, the evacuation of the hemothorax, the removal of foreign bodies and bone fragments from the lung whenever possible, the excision of the wounds in the lung when feasible, followed by suture, and the complete air-tight closure of the thoracic wound.

Following the first procedure, 50 per cent of the cases developed postoperative infectious complications; following the second procedure, 33.33 per cent; and following the third, 8 per cent. The difference in the results appears to be due to the type of operation. In the first the operation was totally inadequate; in the second the great mistake was the failure to close the thoracic wound. The third gave by far the best results and would appear to be the operation of choice in all cases requiring immediate operation. (L. W. J.)

McGREGOR, A. N. *Trap-door operation for empyema.* Brit. Jour. Surg., Vol. VIII, No. 29, July, 1920, page 64.

The object is to produce a flap composed of the whole thickness of the chest wall down to the level of the ribs and to provide an opening by resection of part of a rib opposite the center of the flap, so that pus leaves the chest cavity under the flap during expiration while the movement of inspiration sucks the flap against the opening and so prevents the entrance of air.

Incisions are made along the upper border of the seventh rib and the lower border of the ninth rib. The anterior ends of these incisions are connected by a third incision, producing a rectangle. The whole of the rectangular flap is raised so as to expose the ribs. The periosteum of the eighth rib is incised and a portion removed. The flap is now replaced and held by a tension suture at each corner. The lower border of the flap is raised until the gap in the eighth rib is visible, the periosteum and pleura are incised and the flap immediately lowered.

The pus oozes out under the flap during expiration and on inspiration the flap is sucked against the opening so as to close it. At the end of about 10 minutes a bulky dressing is applied. When the discharge finally ceases the edges of the incision may be sutured. (L. W. J.)

IVY, R. H. *War surgery of the face and jaws as applied to injuries and deformities of civil life.* Penna. Med. Jour., Vol. XXIV, No. 2, November, 1920, page 60.

The most important lesson in connection with maxillo-facial injuries is the necessity for the closest cooperation with the dentist in handling these cases, not only where the jaw bones themselves are involved but also in injuries of the soft tissues of the face and nose. Aside from the construction of supportive and fixative appliances, no one is better fitted than the dentist to handle the mouth sepsis arising from bone sequestra and dental lesions.

About 10 per cent of gunshot fractures of the mandible with loss of substance result in nonunion or malunion and require bone graft-

ing for restoration of function. In fractures sustained in civil life loss of substance with nonunion is rare and cases of this sort seldom require bone grafting. There are, however, two classes of pathological cases involving loss of substance of the lower jaw in which bone grafting should be considered as a reconstructive procedure. These are: (1) Loss of a segment of the bone following osteomyelitis and necrosis, and (2) loss of a segment of the bone by operation for removal of a tumor. In each case little or no attention is usually paid to maintaining the correct position of the lower jaw in relation to the upper. Consequently when the bone is removed the ends of the two fragments approach each other, either uniting or forming a loose fibrous connection with shortening of the mandibular arch, loss of function, and deformity.

Bone grafting of the mandible has now been established as a definite procedure, with indications, technique, and prognosis laid down as firmly as for almost any other operation in surgery. So that in these peace-time cases of loss of mandibular substance, bone grafting may be confidently resorted to in restoring continuity. This may be done by pedicled graft from the mandible itself; by the osteo-periosteal graft from the tibia, or by a thick graft taken from the tibia, rib, or crest of the ilium.

Preoperative treatment consists in removal of all sources of sepsis, reduction of the fragments and fixation in such position that the normal occlusion of the teeth is restored. (L. W. J.)

LEE, B. J. The war's contribution to civil surgery. *Ann. Surg.*, Vol. LXXII, No. 6, December, 1920, page 758.

This paper represents an effort to find the mind of the New York Surgical Society as to the applicability of certain of the war surgical methods to civil practice. A questionnaire was sent to every member of the society.

1. To what extent do you practice primary closure of compound fractures of the extremities? Do you approve the principle?

The answers indicated that the practice of primary closure of compound fractures is sound and that the principle is approved, but that the cases must be carefully selected and the surgery well done to achieve success.

2. To what extent do you use the principle of secondary closure of soft-tissue wounds? Do you approve the principle?

With one exception, there was absolute unanimity in favor of secondary suture and the principles underlying its use, this decision, however, being conditional upon having in hand a Carrell-Dakin supply and technique beyond criticism. The society as a whole, places itself on record as almost unanimously favoring secondary suture.

3. To what extent do you use the Carrell-Dakin solution and technique? Do you approve the principle?

There was but one viewpoint concerning this question, and that an enthusiastic one for the principle and use of wound sterilization by the Carrell-Dakin technique. The society is unanimous on one point—only the accepted technique or none at all.

4. To what extent do you use the principle of immediate active mobilization in postoperative joint conditions? Do you approve the principle?

The majority of the members are in favor of Willems's method in dealing with clean-joint operations.

5. To what extent do you use the principle of active mobilization in septic joints? Do you approve the principle?

Ten of the members of the society absolutely opposed the use of the principle, but the majority approved it. (L. W. J.)

HYGIENE AND SANITATION.

STRONG, R. P. The antityphus campaign in 1915 in Serbia considered in connection with the present typhus epidemic in Poland. *Internat. Jour. Pub. Health*, July-September, 1920.

Dr Strong has achieved in Serbia the manifestly impossible with typhus, as he did in Manchuria with pneumatic plague. The Herculean cleaning of the Augean stables pales in comparison. The suppression within six months of an epidemic where the daily admission rate exceeded 5,000, the mortality ranged between 30 and 70 per cent; the number of cases at any one time exceeded 50,000, and the number of deaths in six months 150,000 merits full praise, and stimulates further investigation of his admirable methods.

This disease was introduced into Serbia by the Austro-Hungarian prisoners of war, and the situation upon his arrival was indescribable. His first efforts were directed toward the establishment of a central organization and control, so that absolute authority over all sanitary matters throughout Serbia could be secured. There had been no general campaign of attack on the epidemic before. Several foreign relief units were not being employed at all, and two units from the same country were found to be working almost side by side with a different plan of action. Accordingly there was established an international sanitary commission whose resolutions were immediately enforced, when necessary, through the ministers of the interior and of war. This commission consisted of British, Serbian, French, and Russian officials, with headquarters at the war capital of the Government in Nish. The country was divided into sanitary districts; and sanitary personnel or hospital units, sanitary stations and hospitals were assigned or distributed to these.

Preventive methods were considered first, and included: General disinfection of people in badly infected districts; general house-to-house inspection in such districts with removal of patients to hospitals for typhus cases; disinfection of other inmates of such houses; disinfection or disinfection of houses from which patients were taken or in which deaths from typhus had occurred; the establishment of quarantine and bathing and disinfecting stations at important points throughout the country; the limiting of railway travel by reducing the number of passenger trains; the establishment of a system of limited travel permits and of inspection of travelers, only cars with wooden seats with no upholstery being permitted to be run; provision for the cleaning and disinfection of public vehicles, particularly of cabs at the railway stations; the sanitary inspection of restaurants and cafés; establishment of regular hours of closing during the day for cleaning and disinfection, and of methods to be employed for such disinfection; regulations for hospitals in connection with the disinfection of the wards, bedding and linen, and of the inmates and their clothing; the establishment of free dispensaries in various cities, not only for the treatment of the sick but for the early detection of individuals suffering with infectious disease; a campaign of education with printing and distribution of circulars in the Serbian language regarding the nature of the disease, the manner of its spread, and the precautions to be taken to avoid infection.

All these measures were watched closely by a system of sanitary inspection, most of the inspection being done by Dr. Strong.

The success of the campaign in Serbia was due largely to the fact that the people were instructed and finally convinced that the disease was avoidable and could be arrested largely through their own efforts. Dr. Strong does not believe, as he was warned to believe, that it is necessary to elevate the entire moral tone of the people and their mode of living. Various crude makeshifts were used, from sheer necessity, in disinfection, disinfection, and bathing. The disinfection of hospitals consisted in fumigation with sulphur, followed by the removal of all beds which were scrubbed with soap and water and then treated with carbolic solution. The floors and walls were scrubbed or sprayed with carbolic acid or bichloride of mercury solution. The mattresses and blankets were steamed, and the sheets and other bedding boiled.

Proper uniforms were provided for those working in infected places. Masks were required for those who came in close contact with patients, particularly those who examined the throats of patients. The method of transmission by droplet infection has not been definitely eliminated.

Heat was considered the most satisfactory means of destroying lice and ova. When dry heat was used a temperature of 60 C. for 15 minutes was considered safe for delousing clothing and blankets. When steam was available a temperature of 100 C. for 15 to 30 minutes was used. Petroleum was considered a very satisfactory disinfectant. Phinotos oil (solution 2.5 per cent) was employed in the hospitals for spraying or washing the bodies of patients after bathing them. Sulphur fumigation was probably the most satisfactory disinfectant at hand. (Five-eighths pounds per 1,000 cubic feet; time 12 to 24 hours.) Crude naphthalene was employed in finely powdered form for individual prophylaxis. This was dusted over the underclothing after inspection of prison camps, etc.; also on pillows and sheets in hotels at night.

Although transmission by lice is the accepted one, there have been no scientific and properly controlled actual experiments performed upon human beings which demonstrated that typhus is transmitted by lice. Transmission by droplet infection is accepted by some authorities. Bed bugs and fleas apparently do not transmit typhus, although it seems not unlikely that *Pediculus capitis* may sometimes transmit the disease. It has not been demonstrated definitely that hereditary transmission of the typhus virus occurs in lice, the evidence on this question being contradictory.

The bacteriological studies that were carried on in Serbia during the epidemic did not go to show that any one of the bacteria previously described as specific were in fact the etiological factor in the disease. Full credit is given to the combined efforts of the Serbian medical and sanitary officers together with those of the personnel of the foreign detachments.

Typhus has been epidemic in Poland for four years with little sign of abatement. An international commission has been recommended. It is believed that the antityphus campaign in Poland is not yet being prosecuted by the Polish Government in an energetic and satisfactory manner. Typhus is no longer a Polish question; it has become a world question; and it is costing the world more to tolerate it than it would to eliminate it. (H. L. S.)

PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY.

DAVIES, A. A method of cholera diagnosis. Jour. Roy. Army Med. Corps, Vol. XXXV, No. 4, October, 1920, page 329.

1. Put a platinum loopfull of feces into a test tube containing 5 c. c. of 1 per cent peptone water slightly alkaline to litmus. Incubate for 18 hours.

2. From the resulting culture pipette one drop of the peptone water growth on to one of the divisions of a Garrow agglutinator

slab. Twenty-four specimens can be conveniently examined on one slab. To each of these drops is added a drop of Lister cholera agglutinating serum 1/80 dilution.

3. The slab is then rotated for three minutes at the rate of one revolution per second, so as to bring the culture and serum into intimate contact. The slide is then examined in a suitable light, when it will be found that cultures containing vibrios give well-marked agglutinated clumps obvious to the naked eye.

4. All the positive cultures are assembled, also bottles containing agglutinating serum in dilutions of 1/320 and 1/640. Pipette onto the slab one drop of the 1/320 serum, one drop of the 1/640 serum, and one drop of normal saline. To each of these drops add an equal drop of the culture, rotate the slab for three minutes, and examine. Cultures containing vibrios give well-marked agglutination clumps, obvious to the naked eye.

Readings can be made within 10 hours of inoculating the peptone water medium. Each worker can report on 150 to 200 specimens per day. (L. W. J.)

BORD, J. S. K. Staining of blood smears for the malaria parasite. Jour. Royal Army Med. Corps, Vol. XXXV, No. 4, October, 1920, page 327.

A large drop of blood, many times as large as the drop used for making a thin smear, is received on a clean slide from the pricked lobe of the ear and is spread over an area one-half to three-quarters of an inch square. This is dried, moderate heat being used. The slide is then covered with the following solution, which simultaneously hemolyses the red cells and fixes the remainder of the smear.

	Parts.
Formalin	20
Glacial acetic acid.....	2
Distilled water	78

This is left for at least 10 minutes. The smear is then gently washed in tap water and stained either with borax methylene blue or Loeffler's methylene blue for two minutes or longer. It is then gently washed in tap water and dried by heat, not by blotting.

When examined by the 1/12 objective, such a smear is seen to consist of a greenish background on which are blue-stained leucocytes, blood platelets, and parasites. Of the latter, the most typical, when present, is the crescent. This is a bright blue, and the dark pigment at its center is very conspicuous. The benign tertian parasite can be recognized in any of its pigmented forms. It appears as a bluish-green body about the size of a leucocyte, or less in the case of the

younger parasites. The characteristic feature is the pigment, which is scattered through the parasite in little rods, more or less regular in size. By this it can be differentiated from a deposit of stain or any other artefact. (L. W. J.)

GOUGEROT, H. The saprophytism of venereal organisms and its dangers. Internat. Jour. Pub. Health, September, 1920.

The reality of the saprophytism of the *Spirochaeta pallida*, Ducrey's bacillus, and the gonococcus offers a new approach to the study of these diseases. This saprophytism has often been discussed, but seldom so convincingly as in this article.

Syphilis.—The presence of latent spirochaetae in the viscera must be admitted. Experiments on monkeys have shown that their places of concealment are principally the bone marrow and the spleen. Histological and bacteriological experiments have revealed their presence in tissues of normal appearance. The presence of spirochaetae on mucous membranes (saprophytically) would be of prime importance from a prophylactic point of view. The question is: How long can saprophytic spirochaetae remain alive on mucous membranes? The author found spirochaetae persisting one month in a patient who did not have any relapses of mucous patches. It has been proved that spirochaetae can live several hours and even several days in the vaginal mucus. Clinically many cases would be explained by this saprophytism.

Soft chancre.—Saprophytism has not been studied so much with Ducrey's bacillus. Clinical evidence seems convincing, however. The appearance of soft chancres weeks and even months after the last coitus (one of the patients had been bed-ridden with concussion paraplegia for the previous three months) must be explained somehow when one considers that the incubation period of soft chancre lasts only two to four days. Here saprophytism seems to be proved clinically, but has not been confirmed by bacteriological or microscopical examination.

Gonorrhea.—Practically the same arguments seem to prove the saprophytism of the gonococcus. The bacteriological proof is extremely difficult to make, for there are numerous organisms having the same appearance, which yet do not seem to be gonococci.

The prophylactic interest connected with these carriers of venereal organisms is evident. The fact that a man or woman is clinically free from any lesion does not prove that he or she is not contagious.

The author insists on saprophytism as a fact. (H. L. S.)

PRICE-JONES, C. Diurnal variation in the size of red blood cells. Jour. Path. and Bact., Vol. XXIII, No. 4.

In previous papers the author has described methods for measuring the diameters of red corpuscles in stained films and the variations incident to pathological conditions. Here he discusses variations in healthy persons. A definite method of preparing the blood must be carefully followed to avoid changes in diameter due to fixing and staining. Prick the finger or ear and make films in the usual way. Dry them in air without heat. Fix and stain two minutes in Jenner stain and then for two minutes in a weak, aqueous eosin stain to intensify. "Some convenient form of projection apparatus is then arranged to project the image of the microscope field on to a sheet of paper lying on the table, and adjusted for a magnification of 1,000 diameters. Having chosen a thin portion of the film, the red cells, being well separated, are outlined in pencil, two diameters (maximum and minimum) are measured to one-half millimeter with a millimeter scale, and the mean of these measurements is accepted as the diameter of the cell. The cells are classed into groups, progressing by 0.25 micron, and the mean diameter of 500 cells is taken to represent the mean diameter of the red cells for any specimen of blood."

Studies of red corpuscles in the fresh state yield different measurements, but the changes observed run parallel to those noted in dried stained films. "In an experiment to demonstrate the effect of violent exercise on the diameters, both dry and moist specimens were measured; the diameters in both showed an increase of over 0.55 micron, followed by a diminution of about the same amount.

	Dry.	Moist.
Before exercise.	6.81 (100)	7.744 (100)
Immediately after.	7.40 (108)	8.300 (107)
Two hours later.	6.86 (100)	7.731 (100)

"Further experiments have demonstrated that changes in diameters correspond with changes in volume, the red cells behaving more like pieces of gelatin than like bags of liquid (Fischer, 1915). The volumes were determined by centrifuging in calibrated tubes, all the samples being treated simultaneously, and the values obtained are relative to the control sample. It seems very doubtful whether any accurate measure of absolute red-cell volume can be obtained by hæmatocrit methods; the tightness of packing of the cells, and the degree to which their contents are squeezed out, can not be assumed to be uniform from one lot of blood to another. With cells swollen

with water, such as are dealt with here, gentle centrifuging gives the best results. The hæmatocrit method could not satisfactorily replace the dry film method."

The results shown in the following table—

TABLE IV.

1		2		3	
Time.	Diameter.	Time.	Diameter.	Time.	Diameter.
2.30 p. m.	7.461	10.30 p. m.	7.526	11 p. m.	7.267
4.30 p. m.	7.546	2.30 a. m.	7.452	6.45 a. m.	7.019
6.30 p. m.	7.662	7.30 a. m.	6.904	8.20 a. m.	7.040
10.30 p. m.	7.633	10.30 a. m.	6.983	9.20 a. m.	7.508
7.30 a. m.	7.048	12.30 p. m.	7.265	12.30 p. m.	7.422
10.30 a. m.	7.326	2.30 p. m.	7.315	3.30 p. m.	7.194
2.30 a. m.	7.333	Midnight.	7.332	Midnight.	7.349
		8 a. m.	7.135	6.30 a. m.	6.925
				1 p. m.	7.281

demonstrate a definite diurnal variation in the diameters of red cells in health. The diameters increase during the day and diminish during sleep. This suggests that the measurements are affected by bodily activity.

"By experiment it has been found that (*a*) violent exercise increases these changes, (*b*) gentle exercise has no apparent influence, and (*c*) rest in bed does not abolish these diurnal variations.

"In these experiments 'violent' exercise meant running as quickly as I could up and down six flights of steps three times both ways, until I felt unable to run any more and was distressed in breathing. Films were made immediately before and after the exercise. From the observations recorded in Table V, it appears that it is possible by means of violent exercise to produce in the course of a few minutes quite remarkable increases in the diameters of the red cells."

TABLE V.

No.	Time.	Diameter before exercise.	Diameter after exercise.	Change in diameter.
1	11 a. m.	6.868		
	11.10 a. m.		7.330	0.46
	11.10 a. m.	6.884		
2	11.30 a. m.		7.197	0.313
	12.10 p. m.		6.736	0.46
3	3 p. m.	7.173		
4	3.20 p. m.		7.330	0.16
5	4 p. m.		6.786	0.6

General exercise has no special influence, but rest in bed does not abolish the diurnal variations.

In each experiment increase in diameter has been associated with diminution in alkalinity. A diminution of the CO_2 in the blood by forced breathing leads to a diminution in diameters.

TABLE IX.

No.	Time.	Blood reaction.	Diameter.
1	1.47 p. m.....	28	7. 347
	1.51 to 1.57½ p. m., forced breathing.		
	1.58 p. m.....	34	6. 852
	2.5 p. m.....	29	7. 185
	2.37 p. m.....	26	7. 365
2	1.40 p. m.....	23	7. 508
	1.41½ to 1.47 p. m., forced breathing.		
	1.47½ p. m.....	30	7. 175
	2.3 p. m.....	30	6. 908
	2.10½ p. m.....	22	7. 408

"These results show that after about six minutes' forced breathing the mean diameter of the red cells has diminished by about 0.5μ ; subsequently, as the CO_2 reaccumulates and the alkalinity of the blood returns to normal, there is a rapid restoration of the normal diameter.

"It will be gathered from all these experiments and observations that the diurnal variation in the diameter of red blood cells is presumably due to altered reaction of the blood, though of the details of the alteration there is little direct evidence. * * * But whether the diminished alkalinity and increased diameters which prevail during the active part of the day are due to accumulation of CO_2 or lactic acid, or to some other source of altered reaction, we have at present no means of judging." (J. S. T.)

HERMS, W. B., and FREEBORN, S. B. Egg-laying habits of Californian anophelines. Jour. Parasit., December, 1920.

The authors devoted three summer months to investigations, carried on in a temporary laboratory in the Sacramento Valley, with a view to clearing up egg-laying and other habits of local anophelines. Their observations are published with due reserve having in view the limited time and facilities at their disposal for extensive study.

Four species were dealt with. *A. occidentalis* D. & K., *A. punctipennis* Say, and *A. pseudopunctipennis* Theobald. Throughout the paper the authors refer to the first-named species as quadrimaculatus.

Mosquitoes used in the observations were captured in shell vials at stables, bridges, outhouses, and dwellings and transferred to wide-mouthed pint jars partly filled with water and covered with bobbinet which were placed in rows on a glass shelf supported at its corners six inches above the laboratory table. In this situation an incandescent electric lamp could be placed directly under the jars to illuminate them and facilitate study from above for egg counting. The water in the jars was taken from a deep well and its alkalinity was expressed as 1,840 parts CaCO_3 per million. Temperature of the jars was 88 F. maximum, 66 F. minimum; average 76 F. and 68 F.

A total of 65 egg-layings was recorded from May 17 to July 11. Of 30 occasions when oviposition could be accurately noted, 13 were between 9 and 11 p. m.; 9 between 11 p. m. and daybreak; 7 between sunset and 9 p. m. and 4 during the afternoon. Artificial conditions were undoubtedly influential in this matter. Light, temperature, humidity, and wind undoubtedly affect egg-laying. *A. punctipennis* repeatedly deposited eggs in the full glow of a 40-watt tungsten lamp only 7 inches away. Here the oviposition was undoubtedly despite and not because of the brilliant illumination, for other observations showed that darkness favored and light interfered with this function. Temperature undoubtedly plays a part, and likewise humidity.

Observations of deposition of eggs was almost restricted to *A. punctipennis* but these were interesting. "At 9.46 p. m. the first egg was deposited. This was accomplished by a rather nervous jerk of the abdomen following which an egg was seen to be protruding in a vertical position from the abdomen with its convex side directed to the rear. This position was held for four seconds when another convulsive downward twitch freed the egg from the abdomen, and as the latter was returned to its former position, another egg protruded and slipped instantaneously into the vertical position as the tip of the abdomen regained its original attitude. This procedure was continued for 19 minutes until a total of 174 eggs had been deposited. The deposition of the individual eggs took place at remarkably regular intervals of from six to seven seconds. During the entire operation the female remained motionless except for the monotonous jerking of the abdomen. At the conclusion of oviposition the mosquito remained without changing position for eight minutes, after which she slowly moved off to the side of the jar, scattering the eggs with her legs as she went. * * * The eggs were seen merely to pile up in a heap beneath the insect, toppling over as the mass became top heavy and arranging themselves in various patterns dependent upon mutual adhesion and surface tension. At the time of deposition the eggs are pearly white, becoming progressively yellowish, then darker, until at the end of about 35 minutes the color

becomes distinctly leaden, and in about 45 minutes they appear dull black and under the microscope are a rich chitinous brown.

"Twenty-nine specimens of *A. quadrimaculatus* deposited 30 layings totaling 6,282 eggs, in lots ranging from 140 to 315 eggs each, bringing the average per lay to 209 eggs. Thirty-three females of *A. punctipennis* in 33 layings, ranging from 83 to 321 eggs each, deposited 6,700 eggs; making the average per laying 203 for this species.

"In the course of the work we had several cases where the females oviposited on two consecutive nights. In such cases the two layings were recorded as one. One specimen, *A. quadrimaculatus*, No. 61, deposited two true batches of eggs. In this case the female was captured under a bridge on June 9 and during the afternoon of June 12 she deposited 218 eggs. On June 13 she was given a meal of human blood and on June 19 deposited 140 eggs, dying on June 20. Both batches of eggs were hatched on the morning of June 15 and 21, respectively. On numerous occasions, dissections of females that had oviposited and been fed showed the ovaries completely filled with well-developed eggs.

"The average length of life for unfed *A. quadrimaculatus* in captivity, disregarding their probable length of life before capture, was 4.5 days and for the fed specimens 8.5 days. For *A. punctipennis* the length of life for unfed specimens under the same conditions was 4 days and with food 6.3 days.

"The ease of classification (at least for the three Californian species) by means of egg characters recommends this line of study to workers in other localities. The characters found to vary in such a manner as to make identification simple, are length of the egg, and position and length of the float. The consideration of one or more of these factors is sufficient to place the egg of local species correctly, but in a larger group it would be necessary to utilize other characters.

"In the course of our work we found pools from which there constantly emerged, in the one case *A. quadrimaculatus* and in the other *A. punctipennis*, with no mixture of the species. These pools were therefore classified as *quadrimaculatus* pools or *punctipennis* pools. Eggs of each species were "planted" in the pools hitherto inhabited only by the larvæ of the other species and their development observed. In order to accomplish this under the most natural conditions, "lug" boxes with bobbinet coverings substituted for bottoms were inverted in the pools, supported a little from the bottom by stakes and reaching an equal distance above the surface to prevent overflow. By supporting them a little from the bottom it was hoped that the natural enemies might successfully enter and that the inclosed water would partake of all the conditions prevalent in the pool and still not allow the escape in any appreciable numbers of the surface-feeding larvæ. Through an opening in the bobbinet

covering the eggs were gently washed on the surface of the water in the box. Unfortunately our boxes were of necessity located in pools subject to the rise of a creek, an occurrence that happened several times in the night owing to thunderstorms in the mountains and the unexpected flow of unused irrigation water. Due to this contingency all of our boxes with the exception of one set were found on one or more mornings to be awash, rendering their results problematical. * * * No accurate count of the numbers emerging was possible under the existing conditions, but from general observation no retardation in development or diminution in the expected numbers of *A. quadrimaculatus*, although breeding in an *A. punctipennis* pool, could be noted. The results of this experiment left to our minds only two alternatives in the question of selective breeding places—either the *punctipennis* larvæ are cannibalistic on the *quadrimaculatus* larvæ when the former are in optimum surroundings and the process is reversed when optimum conditions are furnished to *quadrimaculatus* larvæ, or what is far more likely, the female exercises selection in depositing her eggs. Several experiments were inaugurated to settle this first alternative by mixing the eggs in one box, but the floods mentioned above rendered our results untrustworthy.

“For *A. quadrimaculatus* the average incubation period was 2.5 days with a range from 2 to 4 days. The eggs of *A. punctipennis* averaged 3.2 days with a range from 2 to 6 days.”

The following observations were made in regard to desiccation: “Eggs of *A. quadrimaculatus* and *A. punctipennis* were removed from water six hours after they had been deposited by allowing them to adhere to the surface of a strip of filter paper dipped among them, leaving a number of eggs in the jar as a check. The filter paper was then suspended by pins inside a capsule box and allowed to dry out at room temperature. Drying was accomplished in a remarkably short time, for at the end of four hours the paper was entirely dry, and the eggs rattled off its surface at the least movement. At intervals of 24 hours a supply of dried eggs was taken from the filter paper and placed in shell vials of tap water. We were never able to obtain a hatch from eggs of *A. punctipennis* that had been removed from water for 24 hours. However, with *A. quadrimaculatus* eggs removed from the water on June 14, dried and replaced on the 15th, 16th, and 17th, having been subjected to drying for 24, 48, and 72 hours, respectively, there were produced excellent hatches on the 17th, 18, and 19, showing not only that the eggs of this species can withstand drying for these periods, but also the rather interesting fact that egg development ceases as soon as they are removed from the water. Eggs from this lot placed in water on the 18th (96 hours of drying) and for several succeeding days failed to hatch.” (J. S. T.)

PONTANO, F. *Intradermic and subcutaneous reactions from cystic fluid in cases of echinococcus disease.* Policlínico, Rome. Med. Sec. November 1, 1920. -

Exploratory puncture for diagnostic purposes is a dangerous, sometimes a fatal, measure in echinococcus disease. It has given rise to cutaneous exanthems, pruritus, arthritic pains, profound malaise, even convulsions, collapse, and coma. This syndrome develops suddenly and soon disappears. But it has been possible to determine, through the development and course of such symptoms and because of the minute amount of it which entered the circulation, that the cystic fluid itself was not responsible. In animals, even large quantities of cystic fluid have no toxicity.

The clinical analogy between the observed developments and anaphylactic shock have suggested attempts to reproduce the phenomenon in animals previously sensitized by the cystic fluid itself. The results of different observers using a variety of methods have not been uniform.

As a general proposition it may be laid down that the clinical picture elicited by exploratory puncture has the characteristics of anaphylactic phenomena; that experiment has not yet definitely established the antigen quality of cystic fluid as regards anaphylaxis; but on the other hand, both the clinic and the laboratory demonstrate that cystic fluid excites the formation of substances having the power of complement fixation. With a view to estimating the value of cystic fluid in bringing about an allergic state and humoral changes, the author made certain experiments in the human subject, justified by the lack of toxicity of cystic fluid.

Omitting the steps in his procedure, we quote the conclusions arrived at from studies and experimentation (in 34 cases of echinococcus disease and 95 healthy subjects) having in mind: (1) Both specific and non-specific intradermal reactions and the doses required to excite the one and the other; (2) the availability of the subcutaneous route to obtain subcutaneous reactions for purposes of diagnosis; (3) the comparative value of these tests and the Ghedini-Weinberg reaction or the presence of eosinophilia.

1. Hydatid cyst fluid acts as an antigen for the human organism. Successive injections can sensitize a healthy individual and bestow complement-fixation properties on his serum.

2. Freshly drawn hydatid fluid, given by intradermal injection, causes local reaction in those suffering from hydatid disease. Reaction from implantation and deposit is rare.

3. The dose for obtaining specific reactions for intradermic injection is 0.20 to 0.30 c. c.; for subcutaneous injections, 1 c. c.

4. Cutaneous reactions give a high percentage of positive results in those affected by nonsuppurative cysts; a low percentage of negative results in those having suppurating cysts.

5. Cutaneous reactions, while fully as specific as the Ghedini-Weinberg reaction, are more delicate and simple as a diagnostic measure.

6. The attempt to confer a state of anaphylaxis by vaccinations on those suffering from hydatid disease has not been successful.

(J. S. T.)

EYE, EAR, NOSE, AND THROAT.

TRANTAS, A. Eye symptoms in encephalitis lethargica. Grèce Méd. August, 1920.

The author, eye surgeon for the Greek Hospital in Constantinople, reports 30 cases of encephalitis lethargica seen and studied by him from the point of view of ocular disturbance of one kind or another and points out that such disturbance may antedate other symptoms, and the connection between them and the true cause escape detection at first. He emphasizes the difficulty of diagnosis. For example, a patient presented himself to have his visual acuity tested who had come a long ways on foot to see the doctor, had no fever (37.6 C.) or evidence of somnolence and yet he fell fast asleep during the course of the examination. Another case was actually under mercurial treatment and had received intramuscular injections for ptosis before it was determined that the oculomotor paralysis was due to encephalitis instead of syphilis.

Trantas was called in consultation once in a case diagnosed tubercular meningitis and in another diagnosed cerebral syphilis.

Of the 30 cases reported 16 were in men, 14 in women. The ages varied from 11 to 50 years. Of these 30 cases, 26 were characterized by definite involvement of the third and sixth pairs of cranial nerves. One showed slight insufficiency of the sixth pair with slight nystagmus. One had paralysis of the orbicularis palpebrarum (7th N) and one had transient loss of pupillary reflex and myosis. Thus only one of the 30 cases was without distinct symptoms referable to the eye.

The ocular palsies are often bilateral and usually of moderate degree, and the patients can usually partially overcome the deficiencies. These are somewhat affected by posture. One patient who at first suffered with diplopia soon recovered to the extent that the symptom was only present when he was lying in bed and on the paralyzed side. While the palsy may last for months, it is unusual for patients to complain of visual defects except for a few days or even a few hours only, at the outset. The patient neutralizes the false image with the ease of one suffering from concomitant strabismus. Paralysis of the third nerve usually continues for months after disappearance of other symptoms. Ptosis occurred 15 times, 50 per cent (in 5 cases it was

bilateral). In 3 cases there coexisted an almost complete paralysis of the superior recti. Two others had involvement of one superior rectus. Accommodation was paralyzed in 5 of the 15 cases of ptosis. In 8 of the 15 there was reduction of power in the external recti.

Accommodation was tested in 25 of the 30 patients and proved to be impaired in 9 (36 per cent). This is the earliest ocular manifestation of encephalitis lethargica. Inability to read is often the first thing the patient finds wrong with himself when the disease begins to develop. The loss of accommodation is usually partial. In the majority of cases the disturbance was reduced within a few days but sometimes it lasted as much as a month to three months.

Diplopia was present in 15 cases. It was usually early and fleeting. In 7 cases it was associated with loss of accommodation.

Strabismus, independent of diplopia, was present in 6 cases (2 internal, 4 external).

Lagophthalmos existed in 37 per cent of cases.

Nystagmus, or rather movements of this type, were present in 19 cases.

Loss of light and accommodation reflex was present in 5 cases. The phenomenon was transient in 4 and in 1 lasted a week.

Distortion of pupil was observed but once.

Convergence was defective in 10 cases.

Ophthalmoscopic lesions. Dilatation of retinal vessels was very marked in one grave case in which there was fleeting paralysis of upper and lower extremities and persisted unilateral lagophthalmus. The margins of the right papilla were slightly indistinct, especially in lower quadrant. On the nasal side of the papilla there was a large bluish-gray patch of chorio-retinitis traversed by a retinal vein. This was a recent exudation. Vision, both near and distant, was normal. Following amelioration of general symptoms the patient died suddenly. No autopsy.

A girl 17, besides other ocular symptoms, had a round whitish spot, most intense in the center, on the nasal side of the papilla. It enveloped a retinal artery and was not to be confounded with a choroidal tubercle. This also proved fatal. The diagnosis of encephalitis was clearly established in both cases.

The author believes that chorio-retinal symptoms in association with encephalitis lethargica have not been reported before. (J. S. T.)

NOTES AND COMMENTS

Prof. E. Trocello, surgeon and major, Royal Italian Navy, reports an instructive case of chronic broncho-spirochaetosis. (*Ann. Med. Nav. e Colon.* September-October, 1920.)

The anamnesis in brief was: Patient of 40, nonluetic, mother of two healthy living children. At 23 obtained surgical relief for tubercular caries of posterior aspect of manubrium sterni. At 29 began to have blood-tinged sputum at long intervals up to the age of 35, when sharp hemoptysis occurred. Meanwhile there had been at 29 a severe headache of a week's duration accompanied by progressive bilateral reduction of vision and transient diplopia. Treatment with arsenic relieved the diplopia and headache, but glasses became necessary for work. The hemorrhages at 35 induced a state of profound anemia. A clinical examination now suggested the existence of pulmonary tuberculosis. In substance the X-ray report was as follows: Shadows at apices, more marked at the left; intense shadow below clavicle and at claviculo-vertebral angle. Scant luminosity in pulmonary fields and well circumscribed shadows. Cutaneous tuberculin test negative. From 1915 to 1919 good health. Return of hemoptysis in October, 1919.

In all these years there had never been any noteworthy febrile disturbance. The maximum elevation above normal in connection with the hemorrhages was one-tenth degree Centigrade. Likewise there had never been any night sweats nor marked loss of weight. Occasionally there had been slight cough and periods of malaise.

On examination no moist râles or evidence of fluid in lungs. Skin and mucosae pale. Breathing roughened and prolonged at apices. The sputum is muco-purulent; globular elements few. Micro-organisms abundant. Spirochaetae of many forms, some having 5, 6, and 7 undulations of small amplitude and regular; extremities, attenuated; length, microns 10 to 28; thickness, micron 0.4; stain easily; solitary or in groups and clumps. They average 2 to a field of 800 diameters. Sputum also contained diphtheroid bacilli; numerous diplostreptococci and a few micrococci. No acid-fast bacilli present. Diagnosis, broncho-spirochaetosis. Progressive serious meningitis.

In going contrary to the opinion of the physicians who had at various times diagnosed tuberculosis, Trocello was influenced by the

constant absence of acid-fast bacilli from the sputum, though they were repeatedly looked for; by the absence of any serious impairment of health or loss of weight during the long period in which hemorrhages had occurred; by the absence of febrile disturbance or night sweats. In a word, there was a marked discrepancy between the actual findings and those to be expected in view of a diagnosis of tuberculosis. Had the sputum not disclosed evidences of broncho-spirochaetosis a complete study of the case would have been instituted looking to a luetic lesion.

Castellani's broncho-spirochaetosis assumes several forms: An acute, pneumonic type, a subacute, and a chronic. It is the subacute and chronic type which one is liable to confound with tuberculosis owing to the slow and fluctuating course. The case reported approximated a serious condition only through the repeated hemorrhages.

A point of diagnostic value is the clumping of many of the spirochaetae found. It is significant that the diphtheroid bacilli and other organisms found are not rarely met with in pathological conditions showing the phenomena of necrosis.

The British Medical Journal for August 28, 1920, has an interesting editorial review of the recent work by C. Maase and H. Zondck on starvation edema. (Leipzig, 1920.)

The authors make a distinction between the war edema and that which prevailed in connection with epidemic recurrent fever and epidemic dysentery during the war. They report the starvation edema which developed in the wasted civilian population of Berlin during the winter of 1916-17, mostly in males in the second half of life. The onset is often sudden and is seen first and oftenest in the lower extremities, less commonly about the face. Subnormal temperature, bradycardia, lowered blood pressure, and frequency of nocturnal micturition occur. The renal function and urine are unchanged. The blood shows dilution (81 per cent water). Alkalinity and fatty substances are reduced; residual nitrogen is increased. Blood cells and hemoglobin are reduced. Diarrhea is an early, not a late symptom. In rare instances these symptoms simulate polyneuritis. The authors hold that the disease is due to a general reduction of food and not to deficiency of any one element (protein, carbohydrate, etc.). Polyuria and frequent micturition are regarded as symptoms of an abortive type of the disease. Unlike the edema of nephritis this form is not marked by any reduction in the absorptive powers of the capillary walls.

Profs. Holst and Frölich, of the University of Christiania, Norway, have contributed to the *Journal of Tropical Medicine and Hygiene* (Nov. 1, 1920) a carefully prepared report on the preservation of the antiscorbutic properties of cabbage by drying. Their conclusions are that thin slices of cabbage dried for a week in an incubator at 37 C. and thereafter at the same temperature by phosphorus pentoxide show very pronounced antiscorbutic properties when kept at 37 C. in vacuum bottles for 18 to 26 months. The method is considered too expensive for manufacturing purposes. An easier, cheaper, but somewhat less satisfactory plan is to dry in an incubator and place the cabbage in cylindrical, corked, glass vessels containing at the bottom a thick layer of calcium chloride. Place the containers in an ice cupboard where the temperature varies between 4 C. and 12 C. Cabbage so treated will have distinct antiscorbutic value for two years.

D. L. Anderson states (*Brit. Med. Jour.*, Nov. 27, 1920) that men working in collieries will not develop an incapacitating degree of miner's nystagmus if their eyes are normal. The principal cause of this affection is astigmatism and its severity varies with the degree of abnormality. There are two types of miner's nystagmus—the minor, latent, mild variety and the major, grave, incapacitating one. In the production of both types defects of the neuromuscular mechanism of the eyeball are factors as well as astigmatism.

Economy for the individual, the company, and society is effected by preventing individuals handicapped by eye defects from engaging in the work of the mines at the risk of having to give up later, seeking compensation for their disabilities and having, of course, to take up some other form of labor.

Anderson suggests a minimum requirement of 6/18 vision at 20 feet for each eye separately tested by the Snellen type. An error of more than 1 D. plus or minus or astigmatism justifies advising a man to engage in some other occupation.

A. J. Marlin in the same issue treats of miner's nystagmus in the light of a functional disease of the nervous system, ocular symptoms being merely a feature of a syndrome. He regards the disease as essentially one of exhaustion, having a close analogy to the anxiety neurosis of war service. He notes identity of the two conditions in the matter of fine general tremor, altered reflexes, loss of confidence, depressed and haunted aspect, etc., headaches, giddiness, high blood pressure. The disease may be latent for years except for the striking

ocular phenomenon from which its name is derived. The subjective distress is not in proportion to the amplitude of the oscillations. The tremor is too fine to be simulated.

The exciting cause is deficiency of light. The predisposing causes suggested are: Strain induced by the nature of the employment; excess of alcohol and tobacco; accidental injury to the eyes; depression following influenza, etc.; heredity; exhaustion from defective nutrition. The last mentioned is regarded as the main underlying factor.

Despite the most widespread study and research, the bearing of the endocrines, in their relation to each other and to the functions of other organs, on practical therapeutics has not gone very far beyond the stage of hypothesis. A very interesting hypothesis is put forth by Mr. F. W. Broderick in the *British Journal of Dentistry*, 1920, page 955, in regard to the relation of endocrine deficiency to dental caries. In his hands the administration of thyroid and parathyroid gland extracts along with adrenalin and pituitrin has seemed to increase the calcium content as well as the alkalinity of the saliva. Increasing the calcium may arrest caries, reducing it may be of advantage in pyorrhea. (*Lancet*, London, Dec. 4, 1920.)

The *Lancet*, London (Oct. 16, 1920), presents an interesting synopsis of the views of Mr. H. Hartridge in explanation of how bats orient themselves in the dark. "It is neither by vision, nor touch, nor by a sixth sense possessed by bats and not by man, but by a specialized sense of hearing in these animals, since the sound waves of short wave lengths which they are known to emit are capable of casting shadows and forming 'sound pictures.' In many respects sound waves are unlike light waves, but certain sound waves behave like the waves of light. Both, under certain conditions, form sharp shadows, obey the laws of reflection, and are reflected from solid objects. 'Ordinary' sound waves of large wave lengths do not sharply manifest these phenomena, but sounds of very short wave lengths at or near or above the audible limit for man are reflected and cast shadows with ordinary objects; indeed, even quite small objects and flat surfaces of small superficial area reflect these waves sharply, though 'ordinary' sound would not be appreciably deflected. Hartridge suggests that bats during flight emit a short wave-length note, and that this sound is reflected from objects in the vicinity, and this gives the bat information concerning its surroundings. If the path is clear of obstacles no sound waves are reflected back to the bat's ears. If there are obstacles these will reflect the sound, and

the bat receives audible warning. If this be so, the bat seems to have solved some of the problems that were generated and partly solved during the war by the elaborate and complicated methods and scientific ingenuity of the physicists."

The British Medical Journal in reviewing Mr. T. H. P. Heriot's book, *The Manufacture of Sugar from the Cane and the Beet*, gives some interesting facts. The British blockade of 1811 having deprived France of her colonial supply of cane sugar, Napoleon ordered the planting of sugar beets in 70,000 acres of French soil. It was at that time difficult to cause extracted beet sugar to crystallize, owing to saline impurity, and the percentage of sugar in the beet was only 7 per cent. By methods of cultivation and breeding new varieties of beet the saline impurity has been reduced and the sugar yield increased to 20 per cent. Prior to the war Hawaiian sugar cane and German sugar beet were the best. The best yield (exceptional) is 6 tons of sugar to the acre from cane (Hawaiian) with one-half ton per acre in Java. For the beet Germany was able to get 1.7 to 2 tons per acre. Outside of France and Germany refiners have received little encouragement in elaborating machinery and processes for obtaining maximum yield. Seventy years ago it was shown that the fibers of the used sugar cane could be made into wrapping paper. Alcohol may be obtained from the by-product, "final molasses." The cane itself is an available fuel for boilers in factories.

In Germany another by-product, yeast, was used during the war to fix atmospheric nitrogen as a source of nitrates needed for the manufacture of explosives, etc. Before the war Germany produced a million tons of beet sugar a year. The huge advances in production and refining of sugar have come from the efforts of the scientist rather than the practical sugar producer.

The American Journal of Physical Anthropology, Volume III, No. 3, contains an interesting paper by the late Sir Armand Ruffer on ancient Egyptian teeth. The study was not complete at the time of Ruffer's death, and the paper has been finished by the distinguished investigator's widow, assisted by Captain Willmore, R. A. M. C.

Among other conclusions arrived at by the author we note that neither syphilitic nor rickety teeth were found in Egyptians up to the Coptic period. There is no direct evidence that the ancient Egyptians used toothbrushes. Operative dentistry seems not to have been practiced. Even simple extraction was rare. In Egyptian

cemeteries many teeth were found so diseased that they were about to drop out, but the sufferer was allowed to die without the relief that this simple procedure would have afforded. No teeth were found that showed fillings of gold or other metal. A set of artificial teeth was found in a Roman grave in Egypt, but it was presumably tied in place for cosmetic purposes only and not available for masticating.

"Among ancient Egyptians anomalies in position, structure, and number of the teeth were rare and did not seem to become more common as modern times were approached."

Attrition was marked, due to the character of the food used. The bread, which was a large element of their diet, was made from a very coarse dough containing husks, unbroken fragments of wheat or barley and even straw. This coarse bread, with its inevitable content of sand and earth and perhaps of fine particles of stone derived from the mortars or grinding stones used in making the flour, though helping to keep the teeth clean, was injurious to the masticating surfaces. Soldiers, whose daily ration was 4 pounds of bread, must have had marked impairment of the teeth. The consumption of raw vegetables—lentils, beans, artichokes, asparagus, cabbage, and beet root—contributed to attrition.

Evidences of caries and dental disease have been found so generally that it may be assumed that every epoch and every human species has suffered freely from toothache. "Alveolar and perialveolar abscesses were common at all times in Egypt, and were evidently produced by the same processes as they are now."

Various forms of pyorrhea existed; many cases of joint disease—chronic arthritis and spondylitis deformans—in which the dentition was healthy. The most frequent cause of loss of teeth in ancient Egypt was chronic suppurative periodontitis.

Dr. A. C. Heublein (Am. Jour. Roentgenol., April, 1920) divides the symptoms of enlarged thymus in infants into general (muscular hypotonus, eczema, lack of resistance to acute infectious diseases, convulsions) and local (those due to mechanical pressure and interference with respiration). Respiration is audible, and when there is dyspnea a distinct crowing sound is heard with inspiration. He has treated 41 cases with radium and finds this form of therapy satisfactory particularly in these features: One treatment suffices; it can be given at the patient's home; there is no alarm on the patient's part. The resistance offered by the infant to the fixation necessary for employment of the Roentgen ray is injurious and may cause death. The technique is cross-firing with 100 milligrams of radium

element, filtered through 3 mm. silver at a half-inch skin tube distance. The tube remains in place 2 hours, giving a total voltage of 800 milligram hours. Time being a factor of importance, the author now uses 200 milligrams with a one-hour exposure.

According to the Policlinico, Rome (Jan. 3, 1921, Sez. Prat.) there have been 150 cases of bubonic plague in Paris during the last five months of 1920. They occurred among the thousands of Russian and Polish refugees now in the French capital.

The municipal government of Rouen has recently taken steps to enlarge the scope of its antivenereal campaign. Six physicians, a trained nurse, a female caretaker, and a few policemen constitute the active personnel in the movement which is directed wholly to perfecting the treatment of venereal disease in professional prostitutes. The equipment consists of examining and treatment rooms supplied with every convenience for diagnosis, administration of intravenous medication, etc. These are in addition to existing facilities in special wards of a hospital. Furthermore, every licensed brothel is now provided with a small examining room fully equipped for the use of the municipal physician. Prostitutes are required to report to the health authorities twice a week and as much oftener as may be desired. Those capable of transmitting contagion may be interned at the hospital as long as necessary. According to the *Presse Médicale* (Jan. 12, 1921) the prostitutes appreciate the improved service being inaugurated, and are cooperating with the authorities.

Alumni of the University of Virginia will learn with regret that there is a movement on foot, opposed at the university itself, to transfer the medical school to Richmond. This would deprive the medical students of the university of the incalculable benefit of residence in a university atmosphere with all its collateral opportunities for development. The debating society, the college magazine, association with students and members of the faculty of other departments, the lectures delivered from time to time by visitors of distinction, the social and athletic life of the university are valuable means of training which would be lost to members of the medical department if this radical change were effected. Even if from a strictly technical standpoint, a slight gain were sure to result from this dissociation of a portion of the students from the main body and from a seat of learning that has for a hundred years given a

distinct hall mark of refinement and culture to its alumni, such a gain would not offset the resulting disadvantages. Charlottesville has been steadily growing in importance as a center of medical relief since the establishment of the university hospital. To transfer the medical school, its faculty, and hospital to Richmond would be prejudicial to the interests of the population, both urban and rural, of a considerable portion of the State.

The importance and value of postgraduate instruction for medical officers is fully appreciated by the imperial Japanese Navy. All medical officers have a 6 months' course soon after receiving their commissions, again after 4 years at sea, and finally some 5 to 10 years after completion of the second course they enjoy a 2 years' course either abroad or in Tokyo. After this specialization is authorized.

A splendid site comprising the entire block between B and C Streets and Twenty-first and Twenty-second Streets NW., facing the Lincoln Memorial in Potomac Park, Washington, D. C., has been purchased at a cost of \$200,000, for the erection of a home for the National Academy of Sciences and the National Research Council. Funds were contributed by various friends and supporters of these institutions, and the building will be erected at the charges of the Carnegie Corporation, of New York.

Dr. Henry S. Houghton, who for 15 years has had a varied and valuable experience as teacher and practitioner of medicine in China, has been appointed director of the Peking Union Medical College. The faculty of 40 includes American, British, and Chinese scientists. Women are admitted as students in the premedical and medical courses and to thorough courses in nursing on equal terms with male students.

It is interesting to note that, while the output of the German dye industry since last July has been one-third that of the prewar period, the American production of dyes during 1919 was equal to or in excess of prewar imports, excepting vat dyes other than indigo. More significant still is the fact that while there has been a drop in the dyes obtained with relative ease, there has been an increase in the dyes of better quality, for which there is constant demand. (Census of Dyes and Coal-Tar Chemicals, 1919. Tariff Information Series No. 22, Superintendent of Documents, Government Printing Office. Price, 20 cents.)

The London Lancet (Oct. 30, 1920), commenting on the editorial by former Surg. Gen. W. C. Braisted, United States Navy, in the Military Surgeon, which sets forth the advantages and disadvantages of the naval medical service as a career, says: "Most of Admiral Braisted's argument is equally a recommendation to young practitioners in England to join their own royal navy, and as such we bring it to their notice here." The reviewer in referring to our 500 vacancies sees in this large number—"more than there were officers in the medical department of the British Navy before the war"—a confirmation of "the rumor that the United States means to have in the future a very large navy." He notes with surprise that Government provision is made for transfer of effects, and that there is reimbursement for travel expenses of one's family. Other than service readers are perhaps unaware that the provision in question was not authorized until 1920.

J. W. Trask, Medical Director, United States Employee's Compensation Commission, has rendered the following decision:

The dispensary at the Naval Academy is a United States dispensary, and the hospital is a United States hospital within the meaning of section 9 of the compensation act. Such dispensaries and hospitals care for injured employees under authority said section 9. Designation is necessary only in case of civil nongovernmental hospitals.

Injured employees seeking treatment under section 9 of the compensation act, if they are bed cases, should be placed in hospital; if they are not properly hospital cases, they should be able to return to the dispensary for treatment by the United States medical officers at the dispensary. The commission has made no provision for care of employees at their homes, cases being considered either hospital cases or dispensary cases.

Anton Weichselbaum, emeritus professor of pathological anatomy in the University of Vienna, died October 22, 1920, aged 75.

He discovered the causative agent of epidemic cerebro-spinal meningitis in 1887. Two years before this he had succeeded Carl Rokittansky as teacher of pathology.

In 1912, on the occasion of receiving new and special honors as rector for the year, he read an important paper on the relation to health and disease, of physical structure and heredity and on the cause of race degeneration. The latter was ascribed to defective education overtaxing mental strength during the developmental period, to alcoholic excess, syphilis, and tuberculosis.

Mrs. R. M. Kirtland, of Malden, Mass., president of the Malden Women's Civic League and for 16 years an agent of the Daughters of the American Revolution, deserves the thanks of all service people for her recent action in bringing about the prosecution of a Japanese merchant in Boston who had on sale pin cushions made of the American flag and toy dogs (also for pin cushions), the tails being American flags. These articles appear to have been made in Japan. Mrs. Kirtland made a courteous appeal to the merchant to withdraw the articles from sale, stating that if he did not prosecution would follow. The request was resented and as the contravention of the law continued the matter was taken to the courts with resulting conviction and fine. It is interesting to note that the merchant, who has had a store in Boston for 10 years, speaks good English there, but required an interpreter in court!

Dr. Russel H. Boggs, who served in the United States Naval Reserve Force during the war, has a valuable paper on radium in the Treatment of Carcinoma of the Cervix and Uterus in American Journal of Roentgenology, April, 1920.

Farmers' Bulletin 1183, published by the Department of Agriculture, discusses the preservation of leather. An incidental but excellent feature of this publication is an illustration showing the proper kinds of lasts for shoes. From this bulletin we cull the following notes:

In drying wet shoes be careful not to apply heat too rapidly, as this makes for shrinking, hardening, and distortion. Wet leather burns more readily than dry leather. A preliminary removal of mud and grit by means of tepid water is useful. Working shoes may be greased. Neat's-foot oil is the best material for the purpose. Cylinder oil and vaseline, or a mixture of the two, is useful. It is an advantage to combine them with animal oils or greases. The greasing darkens tan or russet leather. Leather that has to be polished is best lubricated with castor oil.

To prevent the feet from getting wet use rubber overshoes. A thoroughly water-proofed shoe has the disadvantage of retaining the body secretions, but at times it may be necessary to waterproof footwear. The difficult part of this procedure is to protect the seams. In summer less grease is required to waterproof shoes than in winter. The following formulas are recommended. The various ingredients should be gently melted and thoroughly mixed. No grease should be applied to the heel if it is made of rubber.

Formula 1:

Neutral wool grease.....	ounces..	8
Dark petrolatum.....	do.....	4
Paraffin wax.....	do.....	4

Formula 2:

Petrolatum.....	pound..	1
Beeswax.....	ounces..	2

Formula 3:

Petrolatum.....	do.....	8
Paraffin wax.....	do.....	4
Wool grease.....	do.....	4
Crude turpentine gum (gum thus).....	do.....	2

Formula 4:

Tallow.....	do.....	12
Cod oil.....	do.....	4

Ordinary leather goods, such as harness, straps, etc., should be cleaned with tepid water and a pure neutral soap, such as castile, by means of a sponge or fairly stiff brush. Hang up until not wet but still damp. Then oil and leave in a warm place for 24 hours. Remove excess of grease with a clean cloth. Any preparation containing mineral acids or oxalic acid injures leather.

The leather binding of books should be kept flexible by an occasional light smear of vaseline, which causes little if any change of color. Otherwise there is a tendency to get brittle and break at the hinge.

There is published at the United States Naval Prison, Portsmouth, N. H., a bimonthly magazine devoted to prison reform, the Mutual Welfare News, which reflects great credit on the editors and contributors.

The United States naval detachment in Turkish waters publishes an illustrated bimonthly paper, Far Seas. Given all the circumstances this represents no small enterprise and initiative. We reproduce the following from the third issue:

JUST SUPPOSE.

Just suppose you were walking down the street and saw some one abusing our flag. What would you do? You'd raise some row! You know doggone well you would.

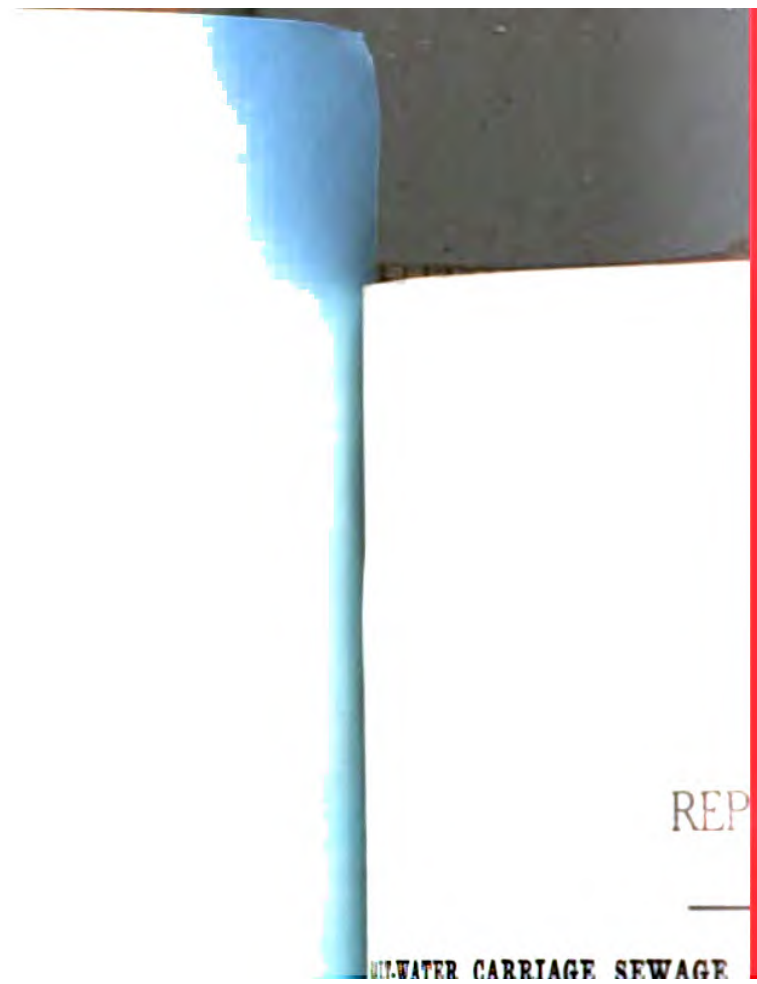
Did you ever stop to think that the uniform you wear is just the same as the flag? They're both emblematic of the country. And, did it ever occur to you that when the uniform is shamed it is a direct insult to the flag?

Now, consider how much worse it is for an American in the service, a fellow who would lay down his life for the Stars and Stripes to be seen disgracing his own flag?

The next time you go ashore and feel like hittin' it up a bit too strong—
THINK.

Picric acid [trinitrophenol, $C_6H_2(NO_2)_3OH$] in aqueous solution is a very convenient and readily applied medicament of undoubted service for burns. Except for burns of limited area and where there is a very little absorption (as on the dorsum and palm of the hand, the sole of the foot, etc.) picric acid should be used with caution. It became very popular in the naval service because it was concentrated and hence economical of space (1 per cent is a saturated solution), easily prepared and applied and made a good substitute for the rather unethical Carron oil so popular in the fireroom. It was available for first aid and battle stations and anybody could slop it on in an emergency. Furthermore, because of its brilliant color and staining properties as well as its very real anesthetic effect it appealed to the melodramatic and advertised both the patient and the hospital corpsman who put on the dressing. It had a moral effect inversely proportioned to the severity of the injury.

Trinitrophenol is obtained by the action of nitric acid on indigo, silk, and a variety of other substances and by the action of nitric acid on the phenolsulphonic acid due to interaction of phenol and sulphuric acid. When absorbed it gives the symptoms of carbolic-acid poisoning as demonstrable by urinalysis, etc. The effect on the kidneys was very noticeable when the victims of the explosion on the U. S. S. *Georgia*, July 15, 1907, were treated with it and other remedies had to be substituted. Captain H. C. Curl, Medical Corps, United States Navy, has recently called the attention of the Bureau of Medicine and Surgery to the danger attending the indiscriminate and wholesale use of picric acid for large burns, and his point is well taken. We have in the so-called "ambrine treatment" and its equivalents a far superior resource for all serious cases. Medical officers will do well to caution nurses, hospital corpsmen, first-aid workers, and others of the very real danger attending the general use of picric acid.



REPUBLIC

WATER CARRIAGE SEWAGE

REPORTS.

SALT-WATER CARRIAGE SEWAGE SYSTEM IN CHARLOTTE AMALIE, ST. THOMAS, VIRGIN ISLANDS OF THE UNITED STATES.

By R. L. PETTIGREW, Lieutenant, Civil Engineer Corps, United States Navy,¹ and
E. PETERSON, Lieutenant, Medical Corps, United States Navy.²

The lack of any system whatsoever with regard to night soil disposal in the town of Charlotte Amalie has, in years past, caused the local health authorities to bring to the attention of the Government the extreme necessity for radical changes in this regard, but the answer always received was that the condition of the municipal treasury did not allow any expenditures of this nature.

In 1915 we find that attempts were made to interest the home Government in giving help for the erection of a municipal water supply for the town of Charlotte Amalie. The communal physician, Dr. Christensen, in his report covering this question states in part: "Strange as it may sound, my chief reason for wishing and hoping that this town may acquire a water supply is the removal of the night soil. * * * It is of no use to claim that many properties are so small and their owners so poor that they can not afford to install water-closets. Those who are unable must be assisted one way or another; for instance, by public closets, trough closets with automatic flushing, or otherwise."

The suggestions and recommendations embodied in the above report died a natural death. The transfer of the Virgin Islands to the United States shifted the responsibilities. Soon after American occupation a survey was made of the situation, revealing some very astounding facts. One-half of the properties in the town of Charlotte Amalie had no facilities for the disposal of night soil. When it is realized that Charlotte Amalie proper boasts a population of over 7,000 inhabitants the condition of affairs may be realized. On some of these premises the night soil was deposited in various kinds of containers which were emptied at intervals of from two weeks to some months, in the meantime allowing several crops of flies to breed. These receptacles were supposed to be emptied in the harbor but in many instances the near lying "bush" or gutter served as a convenient dumping place. No wonder diarrheas, dysenteries, and typhoid fever

¹ Public works officer.

² Chief sanitation officer.

were common. Soon after American occupation an emergency system of night soil removal was installed, consisting mainly in supplying the various properties with covered receptacles and a weekly removal service. In spite of the simplicity of this system the death rate from intestinal infections during the year 1919 has been markedly reduced.

Funds were appropriated last year for the purpose of supplying the eastern part of the town with a nucleus for a salt-water carriage sewage system and for the purpose of erecting a "family joint toilet" with automatic flushing. The latter was recommended mainly for experimental purposes in order to ascertain the practicability of such a feature.

In considering the design of a flushing toilet and night-soil receptacle, the governing feature was the fact that the people to be served were utterly ignorant of the workings of such an apparatus, thereby necessitating an absolutely foolproof appliance. When it is remembered that our navy yards, and, in fact, all industrial establishments, experience a great deal of difficulty in maintaining general toilets against stoppage, because of the almost unbelievable objects that are thrown in the bowls even by the highest type of workmen, the problem of supplying a successful flushing toilet to an irresponsible class of people, almost entirely ignorant of such things, is readily understood.

Another factor to be considered was the fact that the flushing medium would be salt water, whose corrosive action on valves and working parts is well known. Therefore a minimum of working parts affected by corrosion was necessary.

With unlimited funds and resources in skilled labor and materials, it would not have been difficult to supply a satisfactory equipment. But in St. Thomas only raw material could be secured without long delay. Funds were somewhat limited, and an object to be so generally used should primarily involve a minimum of expense, and therefore it was desirable that it should be constructed of cheap, readily obtainable material which could be worked by local labor.

Due to a tendency to meddle and a curiosity common to all people, it was very essential to have the flushing mechanism entirely automatic and totally inaccessible to those using it. This inherent curiosity was the most difficult requirement to meet.

With the above considerations in mind, concrete was adopted as material for the general design. The toilet was constructed along the lines shown in figures 1, 2, and 3, all exposed surfaces being plastered with a rich cement mortar and troweled to a smooth finish. Corners were avoided, all reentrant angles being finished round so as to prevent accumulation of filth. Reinforcing was used where necessary and to provide against cracking. Sufficient slope was

given to the trough to guarantee through flow. Low places were left under the seat and in the receptacle (and urinal) to provide pools of water to receive the night soil and excreta.

In considering the protection against stoppage, it must be borne in mind that the personal habits of people not accustomed to water carriage toilets involve the use, as detergents, of sticks and stones as well as of paper and rags. It was not so easy to prevent stones entering the sewer, but in order to lessen the probability of such an entrance a wall was constructed between the seat and the receptacle with a hole about $2\frac{1}{2}$ by 4 inches (Fig. 1) through which all material deposited under the seat must be flushed. Any large object would then cause a stoppage under the seat, where it would be readily accessible. A smaller object passing through would undoubtedly pass on through the sewer.

This middle wall serves another purpose in that the rush of water in flushing through serves to break up any solid matter of considerable size before it joins that in the night-soil receptacle, where the accumulation might cause a stoppage.

The outlet is a vertical drop into the sewer at the lower end of the night-soil receptacle. The peculiar formation of this outlet is designed to serve the same purpose as the wall mentioned above and, in addition, to act as a trap stopping any long sticks. As will be noted from figure 1, a long stick could not make the turn into the sewer, and any stoppage due to the use of such objects would then occur in the toilet proper.

The flushing mechanism makes use of the well-known principle of the tilting bucket pivoted about an axis so that it will dump automatically when full and return to upright position when empty. This bucket was made of copper with brass rims and brass bearings, the latter set in concrete. It was very easily constructed by local labor. The bucket holds about 5 gallons of water.

Water was led into the flushing compartment through a small pipe and an ordinary stopcock was used to regulate the flow. For all ordinary purposes a very small quantity of water is necessary. The stopcock was set so as to flush about once every 20 or 30 minutes.

The toilet has now been in use over six months and has been very successful. It serves about 10 families with an aggregate of 65 people. That it serves the purpose for which it was designed is proved by the fact that only two stoppages have occurred. The first occurred almost immediately after it was placed in use and was due to a tin can in the night-soil receptacle. The second was some time after and was due to a peculiarly shaped piece of tin which passed into the sewer, stopping the latter some few feet away from the

toilet. Very likely more stoppages have occurred in the toilet itself where persons using it have opened it up again.

As stated above, the chief difficulty arose from curiosity. The running water proved very attractive. Those using the toilet evidently desired quicker action, and endeavored in every way to get at the stopcock to turn on more water. Locks were even broken to gain access to the mechanism. This attraction gradually wore off, however, and the toilet is now operating successfully. In fact, a number of these toilets have been installed and are in successful operation.

The plan was somewhat modified in these latter in that as many as three seats have been placed on one flush tank. In these cases, however, it is necessary to provide larger openings in the walls between the seats.

The above reference to the fact that the majority of the people in this town has for years past had no access to a privy of any kind explains the rather peculiar local habit that necessity has forced upon them, namely, to answer the calls of nature in the privacy of their chamber and then empty the utensil in whatever receptacle they have. This habit rendered the emergency service described above a possibility and is a prominent factor in the successful operation of the family joint toilet. The number of people that a toilet of this kind will serve depends on very few factors. The main one is the size of the family. The bigger the individual family is the more people will the toilet serve, as every family has one receptacle in which the daily output is placed. From 15 to 30 families could with ease be served by a toilet of this nature. The most important factor to be taken into consideration is the distance the family in question has to go to the toilet to empty the receptacle.

Another feature that has to be considered is the fact that a certain number of people will slowly be educated up to the point of using the toilet directly and hence interfere to a certain degree with its general use.

As seen from the above description the function of the toilet is twofold: It is primarily intended for dumping place of the chambers of the various families (see night-soil receptacle in fig. 1). The compartment intended for this purpose can also be utilized by persons who have the squatting habit. The other compartment presents an ordinary toilet seat.

The use of this joint family toilet has a bearing only on the poorer properties which can not afford to install individual toilets. It will solve the serious problem of providing a water carriage sewage system for a group of properties that otherwise would find it an economical impossibility to take advantage of such a system. The

same principle can, however, be utilized wherever salt water is the only economical carrier and the attractiveness of the toilet need only be limited by the funds available.

The toilet described was erected at a total cost of \$231.85, exclusive of sewer and water piping. This figure represents the cost of the first one built and the unit price is considerably lower for later installations.

The toilet is especially fitted for industrial establishments or for salt-water flushing systems. The first cost is low and successful operation is not difficult to maintain.

**THE APPLICATION OF THE SCHICK REACTION TO 2,911 NAVAL RECRUITS
AND THE IMMUNIZATION OF SUSCEPTIBLES TO DIPHTHERIA WITH
TOXIN-ANTITOXIN.**

By B. F. NORWOOD, Lieutenant, Medical Corps, United States Navy.

The simple and exceedingly practical method of determining the natural immunity to diphtheria of human beings by intradermic injection of a minute quantity of diphtheria toxin (1/50 M. L. D. for a 250-gram guinea pig to 0.1 c. c. of saline solution), as originated by Schick (1), proved of tremendous practical value in its application to the military-naval personnel of our country during the late war. The value of this method as an agent in diphtheria control in institutions devoted to the care of children, hospitals, and schools had been demonstrated satisfactorily by the painstaking efforts of Park and Moshage (2); Park, Zingher, and Serota (3); Kolmer and Moshage (4); Weaver and Maher (5); and numerous other able investigators in this country before the mobilization of our military forces. The practical value of the test was even more apparent when Zingher, then serving as a member of the Medical Reserve Corps of the Army, at Camp Upton, published (6) his method of control and interpretation of the several reactions by the use of a heated toxin as a control agent.

This method strikingly simplifies the procedure and permits of fairly accurate readings by those of less experience.

Persons naturally immune to diphtheria have one-thirtieth of a unit, at least, of natural antitoxin to a cubic centimeter of blood, an amount less than this not being sufficient to protect from the disease. Children from 2 to 6 years present the greatest susceptibility, varying greatly at different ages in this group. Of children under 3 months, 15 per cent are susceptible, the susceptibility rapidly increasing until 70 per cent are nonimmune at from 18 months to 2 years, a proportionate decline occurring from that time until maturity, when the

percentage of persons subject to diphtheria is practically the same as at 3 months.

The test serves particularly in institutions devoted to the care of children and in schools and families where diphtheria occurs to prevent the general use of antitoxin, with a consequent transitory immunity and serum sensitization, as well as the burden of expense in procuring the necessary prophylactic agent, which is no small item in the budgets of many families. Upon the discovery of a case of diphtheria, contacts with the disease can be tested and susceptibles determined in from 24 to 48 hours. As a rule, frank negatives can be eliminated in 24 hours, and this great percentage can be spared the necessity of having prophylactic measures directed toward them.

The dilution of 1/50 M. L. D. for a 250-gram guinea pig of a well ripened diphtheria toxin with 0.1 c. c. of normal saline solution is injected intradermally on the flexor surface of the arm or forearm, the control injection being made at the same time on the opposite side. The test material should be freshly prepared. The control dilution, to allow for any deterioration taking place upon heating, should contain about 50 per cent more toxin and be subjected to a temperature of 75 C. for 5 minutes. This will destroy the soluble toxic fraction which causes the definite skin reaction in susceptibles but will not materially affect the protein of the disintegrated diphtheria bacillus and the beef in the toxic broth used for testing. Heating to varying degrees for longer periods serves no useful purpose.

The Schick test material supplied by the commercial firms consists of a capillary tube of well ripened diphtheria toxin and a measured amount of sterile saline solution and is convenient and accurate.

A 1 c. c. tuberculin syringe carrying an ordinary steel needle of 24 or 26 gauge is the most suitable instrument for making the test injections. The length of the barrel affords excellent leverage, which contributes greatly to speed and accuracy when testing large numbers of men.

The exact dosage injected (0.1 c. c. of the dilution) is not so important, it is believed, as the observance of a rigid technique in making the injection. The injection must be intradermal and when completed show a definite wheal which resembles a flea bite. The control injection should present the same characteristic. The proper injection of a minim of the test material will suffice to produce this characteristic elevation of the superficial layer of the skin in the majority of persons, though in some a greater amount is required than in others. In our series a test dilution of 20 mils was sufficient to make an average of 270 tests.

The typical skin reactions following the tests are classified as *positive*, *combined*, *negative*, and *pseudo*. The two former reactions denote a susceptibility, the latter an immunity.

The *positive* reaction is caused by the irritant action on the skin of the soluble toxic fraction of the test material in persons not protected by natural antitoxin. A distinct reaction occurs in from 24 to 48 hours, usually reaches its height on the third day, and fades slowly, leaving a bluish-brown area of pigmentation and branlike scaling of the epidermis, which persists in a number of cases for several weeks. The area of redness is definitely circumscribed and slightly infiltrated. The degree of redness and area of infiltration vary to a great extent with the relative susceptibility of the individual. This observation was made by the New York City Board of Health and was fully borne out in our tests.

The *combined* reaction is, as its name implies, a combination of the positive and pseudo reactions. In other words, a moderately mild irritation of the skin caused by the soluble toxic fraction contained in the test material associated with a local anaphylactic irritation caused by the contained protein of the diphtheria bacillus, etc. The site of injection shows a central area of redness comparable in degree and extent to the positive reaction which is surrounded by an areola of redness that gradually blends into the healthy skin. Over the central portion the infiltration is particularly marked and the entire reaction area is larger. The difficulty of properly interpreting this reaction is removed after observing a definitive area of scaling brownish pigmentation after the anaphylactic response has faded. The control injection represents only a response to foreign protein, fades rapidly, and leaves a blotchy area of pigmentation. The skin remains normal at the site of injection in the negative reaction.

The *pseudo* reaction is a local anaphylactic response to the protein substance of the autolyzed diphtheria bacillus present in the toxic broth used for the test. The reaction is of an urticarial nature, appears within 6 to 12 hours, reaches its greatest development in from 36 to 48 hours, fades rapidly, and leaves a nonscaling bluish-brown area of pigmentation. The skin at the site of control injection reacts in a like manner. The following table (Table I) prepared by Zingher (6) is most valuable and was used as a guide in all of our tests.

TABLE I.—*Compilation of data obtained by subjecting 2,911 naval recruits to the Schick reaction.*

Men tested.	From—		Age.	Susceptible.				Percent- age sus- ceptible.	Susceptibles.	
	Country.	City.		Yes.		No.			City.	Coun- try.
107	40	67	17-24	10	2	92	3	11.21	8	4
105	49	56	17-28	7	2	93	3	8.57	4	5
103	43	60	17-28	15	3	83	2	17.47	12	6
100	12	88	17-27	8	1	85	6	9.00	8	1
104	42	62	17-28	18	4	80	2	21.15	11	11
109	42	67	17-25	14	0	93	2	12.84		
108	56	52	17-29	8	0	96	4	7.40	4	4
106	50	56	17-23	22	2	80	2	22.64	13	11
102	24	78	17-22	12	0	90	0	11.76	12	1
101	36	65	17-34	10	2	85	4	11.88	9	3
104	36	68	17-29	5	2	97	0	6.73	3	4
101	23	78	17-23	3	3	83	2	5.94		
107	41	66	17-25	14	3	88	2	15.88	11	6
100	50	50	17-30	8	3	90	2	11.00		
106	52	54	17-21	24	1	81	0	23.58	12	13
101	47	54	16-25	19	1	79	2	19.80	9	11
111	61	50	17-24	25	2	83	1	24.32	14	13
105	53	52	17-34	13	3	86	3	15.23	6	10
108	29	79	17-23	1	1	106	0	1.85	1	1
105	22	83	17-27	6	0	99	2	5.71	4	2
107	66	41	17-28	11	3	93	0	13.08	7	7
97	35	62	17-29	9	4	82	2	13.39	10	3
103	39	64	17-29	20	3	78	2	22.33	14	9
106	39	67	17-34	7	3	92	4	9.43	5	5
108	43	65	17-25	8	0	98	2	7.40		
91	36	55	17-28	5	0	83	3	4.38	4	1
89	34	55	17-25	3	0	79	7	3.37	2	1
117	35	82	17-32	10	1	101	5	9.48	6	5
2,911	1,135	1,776	17-27	325	49	2,472	65	12.38	189	137

Early reading is quite essential to the correct interpretation of the several reactions, for it is then possible to observe the pseudo and combined reactions in their several stages of development and fading. The use of a heated control and early observation tends to eliminate one of the greatest sources of error in the conduct of the test. Unless a pseudo reaction is followed closely through the second and third 24-hour periods, it is frequently mistaken for the combined reaction. This was a common error at first committed by persons being instructed by the writer. It was very seldom necessary to make observations after 72 hours. Later observations were made only in such tests where the interpretation depended on the recognition of the degree of scaling and pigmentation or to note the rapidity of fading.

At the United States Naval Training Station, Hampton Roads, Va., slightly less than 9,000 Schick reactions were performed from February, 1918, to November, 1919, in groups of men varying in number from 50 to 800. The 2,911 tests reported in this communication

represent typical groups, the results not differing materially, if at all, from other groups tested. The tests were performed largely on naval recruits ranging from 16 to 34 years of age, the average age being from 16 to 27. Among this number were several hundred negro messmen. Data for comparative purposes were not obtained. It was observed, however, that reactions in the black were not difficult to interpret after one had become familiar with the average area of infiltration and the degree of scaling occurring in an average number. This small number reacted similarly to the white companies tested at the same time.

TABLE II.¹

TEST.			
48 hours.			
Nonimmune.		Immune.	
Positive.	Combined.	Negative.	Pseudo.
Redness, moderate...	Redness, well marked...	None.....	Redness, well marked.
96 hours.			
Redness, marked.....	Redness, well marked; stands out distinctly.	None.....	Fades rapidly; area of bluish-brown pigmentation.
CONTROL.			
48 hours.			
None.....	Redness, well marked...	None.....	Redness, well marked.
96 hours.			
None.....	Blotchy area of pigmentation.	None.....	Fades rapidly; bluish brown area of pigmentation.

¹ Zingher, Abraham. Jour. Am. Med. Assn., Jan. 26, 1918.

As will be noted (Table II) men were tested in small groups of from 89 to 117 men. The average personnel of the 28 groups numbering 104. Sixty per cent stated they were residents of cities while the remaining 40 per cent were from the country districts. The average percentage of positives from the cities was 12.03. The percentage of susceptibles from the rural districts was 14.85. The general average of nonimmunes for the entire series was 12.38 per cent. The division of city and country subjects in this series is not believed to be of much value, because it was later discovered that unless a man actually came from a farm or rural settlement he would in-

variably designate his home town or community, boasting of only a few hundred or, at the most, a few thousand inhabitants, as a city. In the total number of tests (about 9,000) performed at this station the general average of susceptibles was slightly over 14 per cent. If the test is properly performed and the reactions accurately interpreted the personnel of the Navy will not yield a higher percentage of susceptibles, though wide variations in the results of tests have been reported from several sources. Our greatest percentage of positives in one of the 28 groups was 24.32; the lowest, 1.85. It is felt that the basis for an accurate estimation of susceptibles to diphtheria among the naval personnel should not exceed 5,000 tests. An equal number of susceptibles were found among carriers of the diphtheria bacillus.

Immunizing measures were employed by the weekly injection of 1 mil of a slightly toxic mixture of toxin-antitoxin (obtained from the New York City Board of Health) until 3 injections were given. Retesting men receiving immunizing injections was impossible because of the rapid dispersal of the original companies, or units, after leaving incoming detention (where the greater number of tests were made) and their transfer to various places. Park (7) states that "retests with the Schick reaction showed that only 30 to 40 per cent became immune 3 weeks after the first injection; about 50 per cent at 4 weeks; 70 to 80 per cent at 6 weeks, and 85 to 90 per cent at 8 to 12 weeks." He also worked out mixtures of toxin-antitoxin of varying degrees of toxicity in an effort to determine the proper dosage for immunizing purposes. The mixture containing about two Lethal plus doses of toxin to each cubic centimeter, which were either neutral (66 to 70 per cent Lethal plus to each unit of antitoxin) or slightly toxic (80 to 90 per cent Lethal plus to each unit of antitoxin) to the guinea pig, have been used by Park and his associates and, it is believed, they now favor the slightly toxic mixture. It is thus shown that a complete immunity is not conferred by injections of mixtures of toxin-antitoxin during the time required to make the injections but the effect of such measures is cumulative and requires, in the majority of cases, from several weeks to several months until the subject is fully protected. But a definitive immunity can be established in this way that lasts several years.

The constitutional reaction following the injection of this material was not serious in any of our subjects, though in a small number reactions similar to that following the administration of typhoid vaccine occurred. The several cases requiring bed treatment were less than 5 per cent. The total number of reactions, which includes those presenting mild symptoms such as malaise, headache, and a low temperature, but not requiring special treatment, was 8 per cent. Injection of a mixture of toxin-antitoxin in immunes generally

causes a severe constitutional reaction. This occurs frequently when injections are given following a wrong interpretation of the pseudo, or false, reaction.

It is believed that a systematic application of the Schick reaction to the personnel of the Navy, including all officers and men below the age of fifty, with particular attention to the recruit, and the administration of proper doses of toxin-antitoxin would practically eliminate diphtheria from the Navy.

The following conclusions and recommendations are based on the observations made on a large number of tests performed on children and adults:

(a) The application of the Schick reaction is simple and exceedingly practical.

(b) The subcutaneous or intramuscular injection of a slightly toxic mixture of toxin-antitoxin in 1 mil doses at weekly intervals until three doses are given will establish an active immunity to diphtheria in from two weeks to three months that will last from one to three years, if not permanently.

(c) A person presenting an immune reaction does not require prophylactic treatment if exposed to diphtheria.

(d) Immunes, as indicated by the reaction, who are carriers of the diphtheria bacillus do not develop the disease.

(e) All persons (officers and men) under 50 years of age in the naval service should be subjected to the reaction and the susceptibles immunized with toxin-antitoxin.

(f) The result of the test should be entered in the health record of the individual.

(g) Subsequent tests should be made annually on susceptibles who have been immunized, as well as natural immunes, until at least three negative tests have been recorded and the immunity proved permanent.

(h) Medical officers should be instructed in the technic of the test and the proper interpretation of the several reactions.

(i) Medical officers familiar with the work should direct special attention toward determining, if possible, the degree and the duration of the immunity conferred by toxin-antitoxin, and should make a careful report of such observations for the information of those concerned.

BIBLIOGRAPHY.

- (1) Munchen. Med. Wchnschr., 1913, ix, 2608-2610.
- (2) Jour. Am. Med. Assn., 1915, 65, 144.
- (3) Arch. Pediat., 1914, XXXI, 481.
- (4) Am. Jour. Dis. Child., March, 1915, 189.
- (5) Jour. Am. Med. Assn., 1915, 64, 1205.
- (6) Jour. Am. Med. Assn., Jan. 26, 1918. (Zingher.)

SMALLPOX IN HAITI.

By K. C. MELHORN, Lieutenant Commander, Medical Corps, United States Navy.

Alastrim (West Indian modified smallpox) is now epidemic in Haiti. It was introduced recently from Jamaica, where it has prevailed for many months under the name of Kaffir milkpox.

Differing in no way from the description of the disease in the second edition of Castellani and Chalmers Manual of Tropical Medicine, the symptoms of our cases may be summarized. At onset there are: Temperature 102° to 104°, headache, nausea, and vomiting. These continue until third day, when temperature drops to normal or slightly above and the eruption appears. Generally the rash occurs first on the forehead, then on the face, arms, and trunk, and lastly on the legs. In about 1 per cent of the cases the mucous membranes are affected, and in about 90 per cent the soles of the feet and palms of the hands.

The first skin lesions are papules, one-eighth to one-quarter inch in diameter. They have a hard shotlike feeling, and in the mulatto are surrounded by a faint reddish areola. The whiter the patient the more marked is the areola. About the fifth day from onset of disease the papules become vesicles and show a central depression (umbilication). A day or so later the contents become seropurulent and the lesions often become confluent. Sometimes this last feature is so marked that patches the size of one's palm can be outlined easily. At this stage pruritis is annoying. About the tenth day scabs form. When these drop off there is *no pitting*, only a noticeable lack of pigmentation—anemia spots, as it were. These disappear entirely within four weeks.

The first case was discovered in the city of Port-au-Prince, September 22, 1920, the Haitian doctor in attendance having failed to diagnose and report same to the Public Health Service. We have been able to trace back the source of contagion direct to Jamaica via the port of Aux Cayes, Haiti. To date (Nov. 1, 1920) 86 cases have been treated at this institution, the general hospital, Port-au-Prince, with no deaths. The disease is spreading rapidly and will undoubtedly prevail for many months. The accompanying illustrations show a typical case on the seventh day of the disease.

SANITARY REPORT ON LIBAU, LATVIA (LETTLAND).

By A. C. SMITH, Lieutenant Commander, and R. P. PARSONS, Lieutenant, Medical Corps, United States Navy.

The following brief report on sanitary conditions of the city of Libau was compiled by us during the week succeeding the ground-

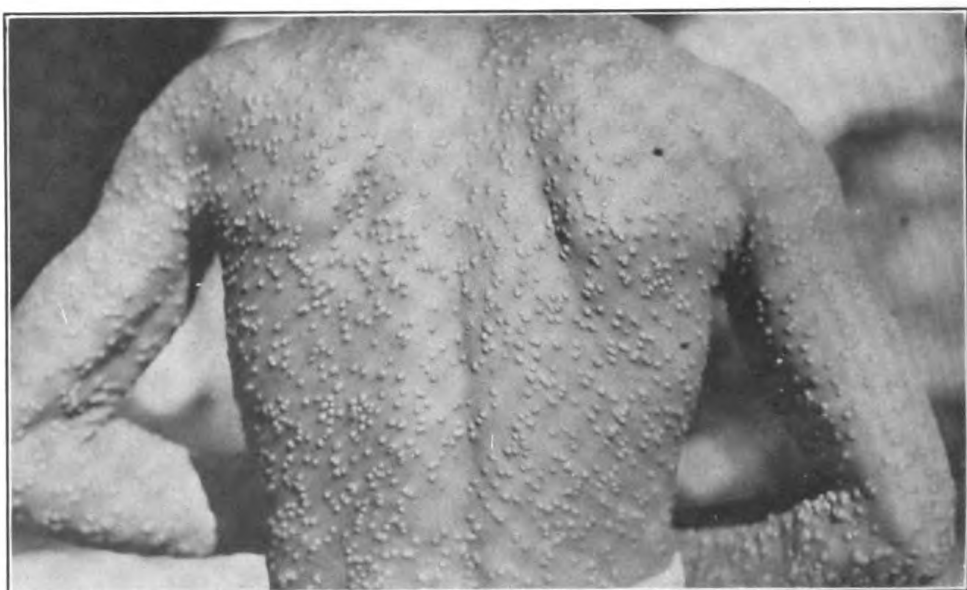


Case of smallpox in Haitian patient.



Smallpox eruption, seventh day.

492-1



492-2

Smallpox eruption, seventh day.

ing of the U. S. S. *Pittsburgh* in the Baltic Sea just off the harbor of Libau in the early part of September, 1920.

The city of Libau is situated on the Baltic coast in the Republic of Latvia, which was formerly a Russian Province. Its position is 57° north latitude and 22° east longitude. The population is roughly 100,000, composed mainly of Letts and Russians. The languages spoken are Lettish, Russian, and German. The city is located on a flat plain; in fact, the average elevation for the entire Republic is about 50 feet. Nowhere is there an elevation above 700 feet. The climate is temperate. The seasonal changes are gradual, although the winters are rather long. Libau is the only ice-free port which Russia had on the Baltic. The climate compares favorably with that of our New England States, with possibly more foggy and cloudy days, averaging about 146 per year. The surrounding country is flat, with many marshes. About one-third of the entire Republic is covered with forests of fir. The area of the city is about 2 square miles. A canal 1 mile long, connecting the harbor with Lake Libau, passes through the middle of the city. The canal is 23 feet deep and about 300 feet wide and has a sluggish current. The city is not subject to overflow. Lake Libau, which is a fresh-water lake about 75 by 35 kilometers, is just inland to the city.

An Artesian stream which is some 700 feet in depth and which underlies the greater part of the city affords the supply for practically all of the inhabitants. In most cases, the water is obtained by an individual hand pump for each building, but power pumps supply some of the larger buildings in the central part of the town. This water is of very fine quality, being perfectly clear and having no disagreeable taste or odor. It has a large amount of calcium salts (the exact amount could not be ascertained). It contains no bacteria and there is no record of any disease in the city attributable to the water. A laboratory in the city hospital is well equipped with modern facilities for conducting examinations of water. About two-thirds of the town is drained by underground pipes which convey the sewage to the canal and thence it is carried to the harbor. The remainder of the town has no drainage whatever, the outhouse being in use, and slops being simply thrown out on the ground. Some of the larger buildings are equipped with electric light, but most of them have nothing but oil lamps. There are no street lights, a disagreeable and dangerous feature.

There are two large hospitals (a city hospital and a military hospital) having respectively 450 and 1,000 beds. There are also two small private hospitals. The city hospital, located at the east end of the town, has three classes of patients. The first class have pri-

vate rooms and receive fairly good food. The second class have beds in small wards and receive poor food. The third class have beds in large wards and receive wretched food. The three classes pay, respectively, 25, 20, and 5 rubles per day, the present rate of exchange being 110 rubles per dollar. The heating is by the hot-air furnace system. The ventilation is by opening the windows. The lighting is electric. The hospital is very old, not fireproof though built of brick, and there is no adequate protection against fire. It is quite well appointed, having well equipped separate operating rooms for septic and aseptic cases. In addition there are satisfactory examination and treatment rooms for genitourinary cases. Separate buildings house the various classes of cases and modern methods of isolation are employed in the building for contagious diseases. There is a thoroughly modern X-ray room, and a well equipped laboratory in which Wassermann reactions are done as well as ordinary laboratory work. An automobile ambulance conveys patients to and from the hospital. This hospital, as well as the other three, are readily accessible to patients landed from ships.

The military hospital is located at Kreigshaven near the war harbor of Libau, within a few blocks of the war-harbor landing. The total capacity is 1,000 beds, capable of expansion to 2,000 or 3,000 beds. It is built on the pavilion plan with six large buildings for surgery, medicine, syphilis, gonorrhea, cholera, and typhus fever. There are also, separate buildings for kitchen, power plant, laundry, and steam disinfection of incoming clothing. Most of the buildings have two stories. Lighting is by electricity. Wood in stoves is used for heating. Ventilation is secured by opening the windows. The staff consists of 8 army doctors and 4 internes. There are fairly modern operating rooms and a very modern X-ray outfit and laboratory. The entire hospital is fairly new. Until recently it has been greatly handicapped because the Germans destroyed all equipment when they retreated from the town. The American Red Cross has fitted out the hospital with supplies of all kinds so that at present it is in very good working condition.

Typhus fever is always present in the city, assuming epidemic proportions during the winter months. Cholera is usually present during the summer. Bacillary dysentery becomes very general during the summer and fall. In the army there is a great deal of tuberculosis. Venereal diseases of all kinds are almost universal in the army and very prevalent amongst the civilian population.

The city is evidently very lax in the matter of health laws and regulations since, even the holder of the office of chief of the city health department had no definite idea of municipal laws regarding health and sanitation and could not supply a copy of any written laws

relating to the subject. No reports of this department of the city have been issued since the onset of the war. So far as could be determined, about the only rule recognized or enforced in this regard is that cases of typhus should be isolated at the city hospital. An American Red Cross physician informed us that several cases of typhus existed which had not been reported and were not isolated.

NOTES ON THE HAMPTON ROADS NAVAL SUMMER SCHOOL.

By K. E. LOWMAN, Lieutenant Commander, Medical Corps, United States Navy.

The experience of having been medical officer for over 800 boys for six weeks, of having examined them all physically at the beginning and also at the termination of this period, of having treated them for various complaints, and of having looked after their general health for the naval summer school term, was, to say the least, a very interesting and valuable one.

These boys, from 16 to 20 years of age, came from every State along the Atlantic seaboard, from Maine to Florida, from the Gulf States, from Tennessee, and West Virginia. The great majority of them had either just finished or were attending courses at the various high schools in their respective communities. They had enlisted in the Naval Reserve Force for three months with the express purpose of receiving a course of instruction at the naval summer camp, Hampton Roads, Va.

On account of the very short duration of the summer school term there was a correspondingly short detention period of only two weeks. We may state that no ill results were noted from this procedure.

Every care was taken that typhoid fever and smallpox should have no chance of making their appearance among the personnel of the camp. Each boy (unless he presented a certificate of recent typhoid inoculation or cowpox vaccination) received the typhoid prophylactic treatment and was vaccinated against smallpox. Naturally some suffered a little reaction, but remarkably few of them had temperatures or exhibited any other symptoms of vaccinia. There was not one case of anything that resembled an infected arm.

It might be said in passing that in vaccinating against smallpox the methods of "multiple puncture," of "incision," and the "single scratch" were chiefly employed, it being noted that the "incision" method gave the largest number of successful "takes."

While the boys were in detention, and afterwards, too, of course, moral prophylaxis lectures were given at frequent intervals. Lieut. Commander P. Richmond, Medical Corps, United States Navy.

accompanied his lectures with realistic demonstrations and picture slides, which in themselves must have been largely instrumental in keeping our venereal record as clean as it proved to be. It is with pardonable pride that we state that there were only two cases of venereal disease amongst the personnel, these both being gonococcus infections of the urethra, and furthermore both lads gave histories of exposure before entering the school.

Among over 800 boys it was found necessary to send only 9 to the hospital for treatment. And among these cases we note 1 of mumps, 1 of chronic appendicitis, 1 of dermatitis venenata, 1 of acute pleurisy. The patient suffering from dermatitis venenata exhibited an interesting eruption extending over the forehead, face and arms, and entire trunk. This boy suffered a great deal of discomfort before the lesions dried up and disappeared.

There were two cases which are perhaps worthy of special mention, where autogenous vaccines were employed with marked success. Two of the personnel who reported to the dispensary on different occasions complained of having suffered for over a year with small "boils" all over their bodies, more particularly over the forehead and trunk. They claimed that they could find nothing to remedy the trouble. On physical examination it was noted that each of the patients exhibited a condition that we may term "diffuse furunculosis."

They were sent over to the base laboratory and autogenous vaccines were prepared from the lesions. The method used in the preparation of these autogenous vaccines was essentially the same as that given by Stitt.

Both patients, after having received three doses each of their respective vaccines, at the proper intervals, were to all appearance cured, and were very happy to have clean, clear skins again. Little reaction was noted in either case after any of the doses. The treatment extended over a period of two or three weeks.

In the general care of the boys' health great reliance was naturally placed on the value of physical exercise and plenty of it. The frequent drills were given in the most pleasant parts of the day. In addition, daily lessons in swimming were given, with practical demonstration and instruction in the simplest and most valuable methods of life-saving. Furthermore there was a camp baseball league, with games played at very frequent intervals. Boxing and wrestling were encouraged, as were, in fact, all athletic sports.

The average gain in height in the short period of six weeks was 0.009 inch, approximately one-hundredth of an inch gain per boy. These figures correspond to about the normal gain in height when compared with other naval training station statistics.

The average gain in chest expansion, really the best test of physical betterment, was found to be 0.632 of an inch per boy, or over three-fifths of an inch average gain in six weeks time. This figure denoted a really remarkable and very gratifying improvement in physical condition.

When the weights at the time of entrance and the time of departure were compared it was found that the boys on an average had lost 0.329 of a pound each, or approximately one-third of a pound per capita. Statistics at the training stations have always shown that, owing to the extra exercise new men take, there is a small loss of weight in the first two months and that in the third month on an average each man gains about 4 to 6 pounds.

In the summer school we see that this rule as to an early small loss in weight held good. The greatest amount lost by any boy was 19 pounds. This was a young fellow, who on admission weighed 242 pounds. So this loss was entirely to his benefit. Invariably when there was any noticeably large loss in weight it was found to be in the heavy-weight class. Of course every one knows that when muscles harden with exercise, excess fatty tissue must go at the same time.

In conclusion I wish to say that the boys who came to the summer school at its beginning were a fine set physically, but we saw going away at its close a superb bunch of bronzed young fellows, clearer of eye and more alert and stronger in physique. They were boys, too, who had learned to love the flag and country more and consequently were of more value to our great Republic as a part of its citizens to be.

MISSING.



ARCHIE LEWIS LAKE,
97th Co., 6th Reg. U. S. Marines.
Home address, LaGrange, Ill.

Wounded in action in France, July 19, 1918. Reported alive in hospital August 29, 1918. Presumed to be still alive but with complete loss of memory. Understood to have been badly wounded in neck and arm. Born in 1896. Height, 6 feet. Weight at time of enlistment, 133 pounds. Blue eyes, light hair. Nicknamed by comrades, "Deacon" and "Slim."

His distressed mother anxiously awaits news of him.

Communicate with

Edward E. Gore,
200 So. 5th Ave.,
LaGrange, Illinois.

PLEASE POST CONSPICUOUSLY.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.

(For review.)

Books received for review will be returned in the absence of directions to the contrary.

A PRACTICAL ROOT-CANAL TECHNIC, by *Arthur Barton Crane, D. D. S.*, Lea & Febiger, Philadelphia and New York, 1920.

The conscientious student of modern dentistry who has read with satisfaction and profit the series of articles on root-canal technique which the author contributed to "Dental Cosmos," will rejoice to know that they have been issued in book form. What is more, Dr. Crane has escaped the besetting sin of the latter-day writer. The little volume has no padding. The essential is set forth clearly, simply, and forcibly. It is easy to be voluble and expansive in presenting one's ideas. It is hard to be at once full and concise. The author has paid to his public the compliment of supposing that it is as busy as he is and has no time to waste on fancy trimmings.

The subjects discussed are presented in the sequence which would be observed in routine procedure. Under "Diagnosis" are noted the limitations of the Faradic current in determining the vitality of a tooth. When the canal is filled with the liquid products of decomposition, a tooth may be as sensitive to electricity as if the pulp were vital. The percussion test of Talbot has wider usefulness than the "dull note" of simple percussion where there is a suspicion that the integrity of the bone around the root is lost. Radiograph all teeth which are nonvital or suspected. Here are noted the confusing factors in interpretation of radiographs. The rational classification of periapical diseases is appropriately illustrated by diagrams, etc.

The student will be repaid by careful attention to the discussion of contraindications to treatment through the root canal. The chapter on asepsis is very practical. In speaking of the use of 10 per cent oil of sweet almonds and alcohol in salt-mouth bottles as containers for root-canal instruments during the course of operation, the author has omitted to mention how he obviates the danger of cross infection due to contact of the handles with the inner surface of the bottle mouth. Under "Instrumentation" the importance of obtaining direct, free access to the canal in the direction of the lumen of the canal, even at the expense of apparently sound structure, is emphasized. One of the most interesting chapters explains the use of the author's "canal openers" which are devised on a sound principle

and obtainable in the market. The recommendation to use ordinary braided picture wire as diagnostic wire for the sake of the properties this wire possesses and in view of its cheapness and availability is noteworthy. In discussing the drugs in common use for therapy, the author gives his technique for ionization with Lugol's solution. This is important in view of the good results obtained with it by him.

The chapter on "Bacteriology" is one of the most useful. Dr. Crane describes his method of obtaining material for cultures and for checking bacterial growth. He advocates mild antiseptic oils for dentine penetration, instead of more powerful escharotic drugs.

Five very pertinent directions are given to prevent overfilling when obliteration of the canal is attempted with gutta-percha points macerated in resin and chloroform:

1. Do not enlarge the apical opening.
2. Use a stirring motion in making the chloropercha.
3. Insert the cone in such a manner as not to force the chloropercha ahead of it.
4. Patiently wait for the whole mass in the apical end of the canal to become homogeneous before beginning to pack.
5. Discontinue packing toward the apex at the first indication of pain. Thereafter pack against the side walls only.

The concluding chapter deals with surgery and will, after that on diagnosis, prove the most absorbing to the professional reader.

PULMONARY TUBERCULOSIS, by *Edvard O. Otis, A. B., M. D.* Second edition. W. M. Leonard, Boston, 1920.

Dr. Otis has produced a model handbook for students, practitioners, and patients. It is rarely justifiable to put into the hands of a patient a book intended to be of technical help to the physician, but it can be done safely in this case, if ever.

The first chapter deals with anatomy and physiology. The second is a brief and interesting outline of the history of tuberculosis. Then follow in the natural order pathology and bacteriology, diagnosis, prognosis, and treatment. Included in the diagnosis is a valuable summary of the steps in examining recruits for tuberculosis. The special features of tuberculosis in children, the questions of climate, prevention, cure, marriage, are all dealt with. The case-history business has not been overdone as in so many of the books now appearing. The style is delightfully simple and beautifully clear. The advice is practical and sound. Rarely does a book come up for review in which the writer's purpose has been so perfectly attained.

A STUDY IN THE EPIDEMIOLOGY OF TUBERCULOSIS, by *George E. Bushnell, Ph. D., M. D. Colonel, United States Army (Medical Corps), retired.* William Wood & Co., New York, 1920.

Colonel Bushnell's book is profoundly interesting. No intelligent, conscientious study of tuberculosis can fail to interest. It could

have been made shorter—padding is the capital sin of modern writers—by omitting many inconclusive data, partial statistics, incomplete reports, and the opinions of some men whose field of observation was extremely limited. The book abounds in long, involved sentences which are for the most part grammatically correct, but make hard reading for the average student. As illustrating this serious defect reference may be made to sentences on pages 10, 13, 16, 26, 171, 194, and 205. We quote a sentence which is typical: "The writer would be the last to object to any measures calculated to improve the health of and to restrict drunkenness among the Indians, but the evil of such teachings is that they divert the attention from more important matters, that we shall be satisfied if regulations are adopted for the exclusion of alcohol, for example, and if it appears that alcohol is nevertheless not excluded, that we shall feel that at least we have done what we could to help, whereas nothing whatever has been done by us for the really important thing—the determination of the degree of tuberculization of the Indian community and the adoption of measures which shall protect those who most need protection." Along with this sort of complexity goes a marked and curious tendency to inversion of the simple, natural order of the words. These faults may be the result of much translating from the German.

The author's postulates, as we decipher them, are: Climate and racial peculiarities are not prime factors in the causation of tuberculosis. Hygienic surroundings play a minor part and affect principally the mortality of chronic pulmonary tuberculosis. It is primary tuberculosis only that behaves like an infectious disease. Predisposition, so-called, is "the sum of influences unfavorable to resistance to already acquired infection." The enormous difference between the chronic pulmonary tuberculosis of adults and the acute, generalized tuberculosis of the infant is thus explained. The adult has a chronic, localized infection because of a partial immunity of long standing. The infant organism is not immunized and receives a massive dosage. In most civilized communities the wide prevalence of tuberculosis leads to an acquired immunity. Among primitive races or in isolated communities where the morbidity from tuberculosis is nonexistent or low, the mortality will be high, and tuberculosis will develop not as a chronic pulmonary disease but as a rapidly fatal acute infectious process. Excluding the rare antenatal infections and the massive and fatal infections acquired from a consumptive mother, etc., immunity is acquired by the young in this wise: If surroundings are cleanly and the child is not directly exposed to consumptives an occasional tubercle bacillus enters the system from the handling of the countless infected articles within a child's reach. These bacilli reach the glands, collect, and possibly multiply until they are sufficiently numerous to arouse specific resistance. The child if protected from sudden massive infection now

proceeds to develop an immunity which protects him through life. This is the "history of the majority of civilized adults."

If the initial infection has been too large, if there have been repeated early infections, if the resistance is lowered by defective surroundings or intercurrent disease then instead of a protective vaccination we get a real infection with results making for serious morbidity and mortality. The obvious lesson is that children should be systematically tested to determine their reaction to tuberculosis, so that those who have not developed immunity may be hedged around with additional care. The substitution of an artificial, premeditated infection for a chance one seems indicated, but this must wait on the accumulation, through perhaps the life of one whole generation, of an enormous mass of data relating to the age at which a positive reaction is obtained and to the later history of those giving either a positive or negative test.

HYGIENE OF COMMUNICABLE DISEASES, by *Francis M. Munson, M. D.* Paul B. Hoeber, New York, 1920.

The appearance of this book is a further manifestation of the tendency to specialization which is taking place in the literature devoted to preventive medicine. In the *Hygiene of the Communicable Diseases* the author has held consistently to his subject. In the preface he characterizes the book as a "manual to present in a concise and readily accessible form the information now available concerning the epidemiology and the management of the communicable diseases, ashore and afloat." The author appears to have been quite successful in this purpose, as the information contained in this volume of about 800 pages is concise and conveniently classified. Also there is a thoroughness in the treatment of the various subjects that is usually not present in books considered as manuals. The work is divided into two parts. The first part begins by describing the causes of the communicable diseases, their means of transmission, the natural hindrances to their dissemination, and concludes by discussing general prophylactic measures and the special prophylaxis for various civil, military, and industrial groups. The second part is devoted to a separate consideration of the different communicable diseases. The book stresses naval and military sanitation. That "it is a matter of history that disease and pestilence are prone to follow in the wake of great disasters such as floods, fires, tornadoes," etc., has caused the author to set aside a chapter for the discussion of the problems of sanitation encountered on these occasions. It is a pleasure to note that the book is well written and provided with an adequate index. Also the work of the publishers is well done. For those who have occasion to seek knowledge concerning the prevention and control of the communicable diseases the book provides a ready and authoritative source of information.

PRACTICAL PREVENTIVE MEDICINE, by *Mark F. Boyd, M. D., M. S., C. P. H.* W. B. Saunders & Co., Philadelphia, Pa., 1920.

This book is intended to supply "the minimum knowledge of the subject which a student or a practitioner of medicine should be expected to possess." This foreword perhaps justifies a manifest attempt to cover a large subject in a limited space, but the book is well constructed and accomplishes the author's purpose. It is scarcely open to question that a little knowledge of hygiene and preventive medicine can not make a health officer out of a general practitioner or even stimulate him to further research and more attention to his duties in this field. The author justly criticizes the general practitioner for his neglect of this important subject about which many books are appearing just now, not all of which fully interpret its value to the public.

The diagrams are instructive and the other illustrations good; the references are complete. Six pages are devoted to air, heating, and lighting; 6 to venereal disease and prophylaxis; 18 to water purification; 21 to demography. In all cases the treatment is too brief. Except for the chapter on the hygiene of infancy, the sixth section might perhaps have been omitted.

There are occasional errata and some of the sentences are obscure, suggesting haste in proof reading if not in composition; but taken as a whole this concise volume is far superior to much that is being published in this field.

PSYCHOPATHOLOGY, by *Edward J. Kempf, M. D., Clinical Psychiatrist to St. Elizabeths Hospital.* C. V. Mosby Co., St. Louis, 1920.

The author presents in a volume of over 700 pages many original and at times startling ideas referable to human behavior in its relation to the development of abnormal mental conditions. To the average physician, as well as to a large class of psychiatrists, the text will appear involved because of terms and phrases that are unfamiliar or technical. When, however, the reader is able to translate the technical expressions used he will find that the subject matter under discussion is clearer and more understandable than in the usual text on the subject.

After discussing the physiological foundations of the personality, in terms of the autonomic apparatus, the author takes up the family situation of the individual. In discussing the latter the author handles the subject in an interesting, enlightening, and original manner. Even those already familiar with the theory of the Freudian school will discover new material for thought and study. He then develops the relation of the personality to the so-called neuroses and psychoses and in subsequent chapters dwells somewhat at length on the various mechanisms found in the domain of psychiatry. His plea for a classification of mental diseases on the basis of the mech-

anism, rather than as at present along symptomological lines, seems to be well grounded. If such a classification could be agreed upon, much of the confusion and disagreement that exists to-day would probably be eliminated.

To many it will appear that Dr. Kempf has been more or less radical in his interpretations of dreams, symbols, and pictures submitted for consideration. Physicians not in accord with Freudian ideas will take definite exception to sexual valuations given to certain symbols and the pictures cited. A like feeling will be engendered in those reading the text who have a natural aversion to the discussion of any subject involving the sex problem. However, the majority will agree that such considerations are necessary now in order that the relationship of the sex problem to the etiology of functional mental derangements may be definitely decided later on.

The text is well illustrated with excellent photographs and case histories of patients with whom the author has had personal contact.

Lack of space precludes an attempt to fully review such a volume in these columns especially since so much debatable material has been presented. For the psychiatrist the book offers many interesting studies, and for the average physician who desires to understand fundamental reactions it supplies information which up to the present had not been offered in so readable a form.

A TEXTBOOK OF HISTOLOGY, by *Harvey Ernest Jordan*, A. M., Ph. D. Second edition. D. Appleton & Co., New York, 1920.

An excellent book. The original illustrations are a valuable contribution to histology. The volume deserves a better binding at the hands of the publishers who must have forgotten the hard usage to which a student's vade-mecum is subjected. For the third edition that will undoubtedly follow there is but one suggestion to make. Simplify the language. Cut long sentences in two. Ideas as well as minute forms of life propagate by fission.

THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY (LEGISLATIVE AND ADMINISTRATIVE HISTORY) DURING THE PERIOD OF THE REVOLUTION (1776-1786), by *Colonel William O. Owen*, U. S. Army. Paul B. Hoeber, 1920.

A valuable compilation of legislative and administrative acts relating to the medical service of the American Army from 1776-1786. The introduction contains these significant words: "The original method of caring for the sick and wounded in the Revolutionary War, which is the beginning of our medical history, was to employ individual medical men wherever they might be found to take care of the sick or wounded who happened to fall in some particular fight in their locality.

"Little by little the generals in command, the provincial congresses of the colonies, and the Continental Congress of the United

Colonies had medical matters forced upon their attention by the numerous bills coming in from doctors, here, there, and everywhere that there had been a battle."

HUMAN PARASITOLOGY, by *Damaso Rivas*, B. S. Biol., M. S., M. D., Ph. D. W. B. Saunders Co., Philadelphia, 1920.

British reviewers have criticized this book rather severely and mainly on the score of departures from accepted rules of nomenclature and occasional "Americanisms." Even if these objections have some foundation the work has much positive merit and deserves the generally favorable reception accorded it in this country. It might have been wiser not to invade the domain of bacteriology.

THE ENDOCRINES, by *Samuel Wyllis Bandler*, A. B., M. D., F. A. C. S. W. B. Saunders Co., Philadelphia, Pa., 1920.

After all the vague conjectures, unproved contentions, and exaggerated expectations of recent periodical literature we had hoped to find in this book a succinct résumé of what is definitely proved about endocrine therapy in general medicine. Hence the book is disappointing. It is written from the viewpoint of the gynecologist, but this viewpoint does not restrain the writer from indulging in much speculation and philosophizing. Beginning with the statement in the preface that "heredity, the effects of environment, and many of the states of mankind can be properly appreciated only by an understanding of endocrine activity and interrelation" the author approaches the features of vital and general interest through 90 pages of argument in favor of recognizing the importance of the endocrines to mental and physical well-being. To-day these arguments are scarcely required. Therapeutic suggestions concerning the endocrines are reached in Chapter XIX, in which the author states: "In recent years our knowledge as to the physiology of the ductless glands has been put to the test by endocrine therapy, and there is no longer any doubt that the future of medicine lies along these lines. In my own practice, endocrine therapy has displaced and replaced the old-time drugs, so that I might safely say that practically 90 per cent of all my prescriptions for internal use consist almost entirely, if not wholly, of endocrine extracts."

LIPPINCOTT'S QUICK REFERENCE BOOK FOR MEDICINE AND SURGERY, by *George E. Rehberger*, A. B., M. D. J. B. Lippincott Co., Philadelphia, 1920.

Imagine a medical dictionary in which summaries of symptoms, diagnosis, and treatment are substituted for definitions of diseases and you have the book. It is what it purports to be, a quick reference book, no more and no less. The arrangement of contents is strictly alphabetical and the pages are not numbered but there are a great many—over 1,200 at a guess. The bulk of the illustrations add nothing to the value of the compilation.

POSTGRADUATE MEDICINE, PREVENTION AND TREATMENT OF DISEASE, by *Augustus Caillé, M. D., F. A. C. P.* D. Appleton & Co., New York, 1920.

No compendium of surgery or of the practice of medicine can go into detailed explanations of technical procedures without developing such bulk as to reduce its value for the general practitioner. There is, therefore, an ever-increasing demand for a volume which will supply the needed minutiae of treatment and minor surgery as developed by an increasingly scientific profession. Dr. Caillé, under the not altogether clear title "Postgraduate Medicine," has supplied this want very well. Section I, "Bedside and office technique," contains very satisfactory directions regarding: Methods of feeding and nursing and appropriate diets for various conditions; hydrotherapy, massage, anesthesia; radium treatment; catheterization, cupping, and venesection; tests and examinations; the obtaining of specimens, etc. Then follow 12 sections giving for each disease well-prepared "general considerations," "prophylaxis," "prognosis," and "treatment." The thirteenth section is devoted to minor ailments. The last covers emergencies of general practice. There is a good index. The volume, though consisting of 1,000 pages and freely illustrated, is of handy size.

It would be a thankless task and give a very wrong impression to pick out the numerous subjects which are treated in a somewhat sketchy and superficial manner. In a work of such wide scope anyone can find minor defects. Still, if a topic like the vomiting of pregnancy is touched on at all it is presumably for the man who, while not a professed obstetrician, nevertheless desires to get some result if compelled to treat a case. The directions here are meager. To tell a man how to make a blood smear for a differential count and not tell him how to stain it is an omission making it necessary to consult one more book. The practitioner who, in trying to relieve a patient of tapeworm, is satisfied to put him on a "liquid diet for 24 hours" before administering the anthelmintic, will usually get many feet of worm, but no "head." The point here is missed. All the taenicides are efficient, provided the intestinal tract is *absolutely empty*. Beer and whisky for insomnia make a hard prescription to fill. The prevention of simple goiter by periodic administration of iodides to young adolescents is not mentioned. It is all very well to say that the nervous manifestations incident to the menopause are not dangerous and to suggest bromides in cases of "dire necessity," but many women really suffer at this time and "suggestion" will not relieve an urticaria. Just in such cases as these does the general practitioner want help, and here the book fails him. From our observation the advice that a woman who does her own cooking and has no appetite should take at least an hour's exercise in the open air before partaking of the main meal of the day or should not eat food of her own preparing can have but a limited application.



VOL. XV

NO. 3

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
CAPTAIN J. S. TAYLOR, MEDICAL CORPS, U. S. NAVY
IN CHARGE

CLINICAL NUMBER

JULY, 1921
(QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1921



NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 3, July, 1918.

SUBSCRIPTION PRICE OF THE BULLETIN.

Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C.

Yearly subscription, beginning January 1, \$1; for foreign subscription add 25 cents for postage.

Single numbers, domestic, 25 cents; foreign, 31 cents, which includes foreign postage.

Exchange of publications will be extended to medical and scientific organizations, societies, laboratories, and journals. Communications on this subject should be addressed to the Surgeon General, United States Navy, Washington, D. C.

TABLE OF CONTENTS.

	Page.
PREFACE	v
NOTICE TO SERVICE CONTRIBUTORS	vi
CLINICAL NOTES:	
SURGICAL SERVICE OF THE UNITED STATES NAVAL HOSPITAL, NEW OR-	
LEANS, LA.	
By Lieutenant Commander W. J. Riddick and Lieutenant Com-	
mander E. A. Stephens, Medical Corps, U. S. N.....	507
A CASE OF HYSTERIA IN THE NAVAL SERVICE.	
By Lieutenant Commander W. A. Bloedorn, Medical Corps,	
U. S. N.....	515
A CASE OF HYSTERICAL CONTRACTURE.	
By Lieutenant A. H. Ehrenclou, Medical Corps, U. S. N.....	521
X-RAY PROCEDURE AND TECHNIQUE.	
By Lieutenant Commander I. E. Jacobs, Medical Corps, and	
Chief Pharmacist's Mate C. B. Worster, U. S. N.....	524
INTERPRETATION OF ABDOMINAL RIGIDITY.	
By Lieutenant Commander Lucius W. Johnson, Medical Corps,	
U. S. N.....	529
A CASE OF ECHINOCOCCUS CYST.	
By Lieutenant C. S. Norburn, Medical Corps, U. S. N.....	530
NONCORRODIBLE INSTRUMENTS.	
By Lieutenant Commander G. C. Thomas, Medical Corps, U. S. N..	532
ASEPTIC TECHNIQUE FOR CANAL INSTRUMENTS.	
By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N..	533
TRAUMATA DUE TO FALLING.	
By Lieutenant Commander H. H. Lane, Medical Corps, U. S. N..	535
ADMINISTRATION OF NEOSALVARSAN.	
By Lieutenant J. B. Bostick, Medical Corps, U. S. N.....	536
DIET DEFICIENCY IN VINCENT'S ANGINA.	
By Lieutenant C. H. Morris, Dental Corps, U. S. N.....	540
VINCENT'S INFECTION OF THE MOUTH.	
By Lieutenant (j. g.) J. B. Goodall, Dental Corps, U. S. N. R. F..	542
PENETRATING WOUND OF THE PELVIS.	
By Lieutenant F. P. Gardner, Medical Corps, U. S. N.....	544
TRAUMATIC RUPTURE OF SPLEEN—REMOVAL.	
By Lieutenant Commander F. H. Bowman, Medical Corps, U.	
S. N., and Lieutenant Commander E. M. Foote, Medical Corps,	
U. S. N. R. F.....	545
OPERATION FOR WRIST DROP.	
By Lieutenant J. I. Yohannan, Medical Corps, U. S. N.....	547
A PLASTIC OPERATION ON THE MUSCLES OF THE SHOULDER.	
By Lieutenant R. W. Auerbach, Medical Corps, U. S. N.....	548
A SIMPLE OPERATION FOR TRICHIASIS.	
By Lieutenant H. S. Cragin, Medical Corps, U. S. N. R. F.....	551
A CASE OF ADENO-CARCINOMA.	
By Lieutenant Commander M. Boland, Medical Corps, U. S. N....	552

CLINICAL NOTES—Continued.	Page.
CHANCROIDAL INFECTIONS.	
By Lieutenant W. F. Pearce, Medical Corps, U. S. N.....	554
A CASE OF INNOCENT SYPHILIS.	
By Lieutenant J. W. Jones, Medical Corps, U. S. N.....	556
A CASE OF CARCINOMA OF THE TESTICLE.	
By Lieutenant W. J. Corcoran, Medical Corps, U. S. N.....	557
REMOVAL OF AN UNUSUALLY LARGE TUMOR.	
By Commander E. L. Jones, Medical Corps, U. S. N.....	558
HISTORICAL:	
A RETROSPECT OF NAVAL AND MILITARY MEDICINE.	
By Captain J. S. Taylor, Medical Corps, U. S. N.....	561
EDITORIAL:	
ACCIDENTAL POISONING—CONTRIBUTING TO THE BULLETIN—THE OMIS- SION OF <i>the</i> —THE FUTURE OF NURSING—COMPARATIVE VALUES.....	627
PROGRESS IN MEDICAL SCIENCES:	
GENERAL MEDICINE—Mechanism of hiccough—Gases in arterial blood—Treatment of arsenic poisoning—Treatment of encephalitis lethargica—New test for nephritis—Blood in pellagra and beri- beri—Ocular symptoms in sinus disease—Reaction from repeated transfusions—Eye symptoms in epidemic encephalitis—Diagnosis and treatment of hemorrhoids—Cost of venereal disease—Future of medicine in the United States.....	637
MENTAL AND NERVOUS DISEASES—The criminal—Brain lesions of dementia praecox—Follow-up studies on mental patients.....	652
SURGERY—Trauma of the abdomen—Rubber dam tampon—Diagnosis of gastric or duodenal ulcers—Postoperative thrombophlebitis— Treatment of fractured patella—Affections of the tibial tubercle...	655
HYGIENE AND SANITATION—Sanitary features of merchant ships....	659
NOTES AND COMMENTS:	
ERRATA—Centenary of von Helmholtz—Retirement of Filippo Rho, Surgeon General, Italian Navy—A diagnostic point in tubercu- losis—Curing hemorrhoids—The X-ray and art—Industrial code of New York—Preservation of eyesight—Basal metabolism—American Society of Tropical Medicine—Laboratory work in the Far East— Dentistry in South America—Fireproofing of fabrics—The explo- ration of Mount Everest—Physical development in Japan—Hic- cough and encephalitis lethargica—Use of fish as food in France— Service items	665
REPORTS:	
RAT-PROOFING AT THE UNITED STATES NAVY YARD, KEY WEST, FLA. By Lieutenant Commander P. E. Garrison, Medical Corps, U. S. N.....	673
REPORT OF THE FIFTH CONGRESS OF THE INTERNATIONAL SOCIETY OF SURGERY, PARIS. By Lieutenant S. B. Burk, Medical Corps, U. S. N. R. F. (inactive).....	681
SMALLPOX IN PORT AU PRINCE, HAITI. By Lieutenant C. J. Brown, Medical Corps, U. S. N.....	695
MEDICAL DEPARTMENT OF THE UNITED STATES NAVAL TORPEDO STA- TION, ALEXANDRIA, VA. By Lieutenant Commander C. C. Kress, Medical Corps, U. S. N..	701
THE HERMAN-PERUTZ REACTION. By Lieutenant G. V. Genzmer, Medical Corps, U. S. N. R. F.....	708
BOOK NOTICES	711

PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the personnel of the Medical Department of the Navy in the performance of their duties, with the ultimate object that they may continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the NAVAL MEDICAL BULLETIN shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, dentistry, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part as extracts) throughout the service, not only will they be employed to some purpose as merited but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Reviews of advances in medical sciences of special professional interest to the service, as published in foreign and home journals, will be given particular attention. While certain medical officers will regularly contribute to this work, it is urged that all others cooperate by submitting such abstracts from the literature as they may at any time deem appropriate.

Information received from all sources will be used, and the bureau extends an invitation to all officers to prepare and forward, with a view to publication, contributions on subjects relating to the profession in any of its allied branches. But it is to be understood that the bureau does not necessarily undertake to indorse all views and opinions expressed in these pages.

E. R. STITT,
Surgeon General United States Navy.

v

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

Vol. XV.

JULY, 1921.

No. 3.

CLINICAL NOTES.

INTERESTING CASES FROM THE SURGICAL SERVICE OF THE UNITED STATES NAVAL HOSPITAL, NEW ORLEANS, LA., DURING 1920.

By W. J. RIDDICK, Lieutenant Commander, and E. A. STEPHENS, Lieutenant Commander, Medical Corps, United States Navy.

A few of the unusual surgical problems encountered at the United States Naval Hospital, New Orleans, La., may prove to be of some interest to the service, and they are presented not alone because of their unusual character but because the opportunities for collecting a large series of cases along any certain line are necessarily limited at one of the smaller hospitals. It is appreciated that clinical observations of an unusual nature are necessarily void of scientific application, and therefore as far as possible no definite conclusions are drawn.

None of the more common surgical conditions is presented, but it is safe to predict that many cases similar to those here described are certain to be found at some time during the varied experience of a naval medical officer.

Case I. J. E. H. SC-2c. U. S. N.

Entered at 3 p. m. November 11, 1920. He complained of abdominal pain that had begun at 10 a. m. the same morning. He felt slightly nauseated, but had not vomited. Had a scanty bowel movement this morning. The pain was worse in right side, was intermittent, but seemingly not very severe. It did not radiate. Pulse was 85, temperature 99°, respirations 20.

Examination.—Patient rather obese. Did not appear to be in great pain. Was alert and interested in the examination.

Head: Negative; throat, negative.

Thorax: Heart tones good; lungs, clear.

Abdomen: Abdomen large, but not distended. Liver dullness not increased. No tenderness over gall-bladder. There was a slight degree of rigidity over the right half of the belly and some tenderness in the right lower quadrant. Patient winced with deep pressure.

Extremities: Negative. Urine showed nothing abnormal. White blood count, 12,200.

Operation.—Right rectus incision; appendix congested; no adhesions; appendectomy. Upon further digital exploration a cigar-shaped mass was felt just under the umbilicus. The mass could not be freed by gentle finger dissection. The incision was enlarged upward and medially.

The ileum was brought into view, and projecting from it a diverticulum about 8 inches long was seen. It was traced to the umbilicus, where it became adherent. From this point a fibrous band ran from the diverticulum back to the ileum, with which it became blended. In this loop a portion of small intestine had become engulfed. The bowel showed beginning dusky discoloration, but the circulation was not as yet impaired to any alarming degree.

The diverticulum was freed from its peritoneal junction. The fibrous band was ligated and severed close to the bowel. The diverticulum was then amputated as in an appendectomy. The stump was buried. One small drain was placed and abdomen closed. The after-treatment required the use of pituitrin, hypodermoclysis, and stimulation. On the fourth day after operation a formed stool was passed. After that recovery was rapid.

Diagnosis.—Acute intestinal obstruction; Meckel's Diverticulum.

No claim is made for any astuteness in diagnosis, since it is candidly admitted that the case was thought to be one of acute appendicitis, but it nevertheless teaches the value of early diagnosis and prompt operative interference in acute intestinal obstruction. After as short a period as 12 hours the bowel showed unmistakable signs of beginning mortification. Had operation been delayed 48 hours the condition would have been indeed alarming and the outcome probably fatal.

The high mortality of obstruction, usually placed at 40 per cent, is due to temporizing or tardiness in diagnosis. As Sir Berkley Moynihan has said: "To operate early in a case of intestinal obstruction is an experience that few surgeons often enjoy." He places the mortality as high as 50 per cent.

This case was interesting as well from the standpoint of the cause of obstruction. Meckel's diverticulum is found in about 2 per cent of all bodies and is more frequent in the male. It is the remains of the omphalo-mesenteric duct of the fetus, which runs from the primitive intestine to the yolk sac. It disappears later on, leaving no trace. A typical diverticulum consists of a blind tube the same diameter as the intestine and it is given off at right angles from the bowel, usually about 30 or 35 inches from the ileocecal valve. The length of a Meckel's diverticulum varies. The one found in this instance was probably unusually long. They seldom reach a length beyond 6 or 7 inches.

When, as is usually the case, the peripheral part of the lumen becomes obliterated, as in this instance, the fibrous band resulting may remain attached to the umbilicus or if long enough is reflected backward and fuses with the bowel. Or the end of the cord may atrophy and the end of the diverticulum lie free within the abdominal cavity. In this form the diverticulum may remain a wholly harmless appendage during the patient's life. At times this fingerlike projection may be the seat of a volvulus or the starting point of an intussusception; or it may become knotted around a coil of the intestines and produce stricture.

Case II. S. A. W., private, U. S. M. C.

Admitted February 14, 1920.

Complaint.—One year ago he began to have attacks of weakness, nausea, headache, fever, and pain in right upper section of the abdomen. These attacks would at first occur every two weeks and continue about three days. Gradually they increased in duration and intensity, eventually confining him to bed.

Upon admission patient was weak, nauseated, had no appetite, and was constipated. He later complained of pain in the right hypochondriac area, the pain radiating to the right shoulder.

History.—Before his present illness, which began one year ago, he had enjoyed good health. Close questioning brought out the fact that while on duty in the Philippines in 1919 he was treated for a mild diarrhea, which lasted about 10 days. He was in bed only a day or two at that time. He had typhoid fever 10 years ago; measles and mumps in childhood. Otherwise his past was unimportant.

Family history.—This seemed to have no bearing on his present condition.

Examination.—He was fairly well nourished, but showed a distinct hepatic cachexia. Eyes were slightly icteric and suggestive of anemia. Pupils reacted smartly to light and accommodation. Ears, nose, and throat were negative. Tongue was coated. Breath foul. Heart tones were clear.

Lungs: Respiratory excursus on the right appeared diminished and the breath sounds seemed not quite so distinct as on left side. There was no moistness or impairment of resonance.

Abdomen: Liver could be felt below costal arch and percussion revealed hepatic dullness increased in all directions. There was tenderness over the gall-bladder and right-side rigidity was evident. Abdomen was tympanitic. Spleen not palpable. No other tender points.

Extremities: Negative.

Nervous system: Depressed; apprehensive. Reflexes normal.

Genito-urinary system: Negative. Denies venereal infection.

Urine: Negative for albumin and sugar; specific gravity 1020; acid in reaction; occasional hyaline casts; a few white blood cells and an occasional red blood cell; a few pus cells.

Blood: No malarial parasites found. White blood count, 12,000 upon admission. Later the count varied between 10,000 and 18,000. Red blood count, 3,900,000; Hb, 85 per cent.

Feces: Clay colored; a close search for *entameba histolytica* revealed one suspicious organism.

Noguchi reaction repeatedly negative.

Blood pressure: Systolic, 130 mm. Hg.; diastolic, 85 mm. Hg.

Roentgenography: Diaphragm on right side appeared slightly higher than on left. There was no evidence of gall-stones. This was valuable as negative evidence only. It should be borne in mind that Roentgen ray plates as usually exposed reveal gall-stones in only a very small percentage of instances in which they exist. Gall-stones must contain enough lime to give a shadow that is discernible in the Roentgen ray plate. It has been shown that pure cholesterol stones throw no appreciable shadows. Skiagraphs revealed nothing further of importance.

Course of the disease.—A course of ipecac was instituted. Patient had a stubborn cough, unproductive and metallic in type. Later complained of sweating slightly during sleep. All other symptoms were present, varying in degree from time to time.

Temperature fluctuated between 99.5° and 102°, with remission in the morning. Pulse ran between 90 and 110. Respirations were 18 to 22.

April 3, 1920. Patient unimproved. Exploratory laparotomy. Incision 5 inches in median line, extending downward from xiphoid process. Liver was found markedly enlarged; gall-bladder normal in size; no stones were palpable; stomach appeared normal. The liver appeared congested and numerous adhesions were attached to it. The lower half felt normal. In the upper half a large area quite soft to the touch could be outlined. Surrounding this was an area of induration. A trochar was passed into the soft area and about 300 c. c. of chocolate-colored pus escaped.

The abscess was so situated that a more posterior incision would give better drainage, and it was decided to close the abdominal incision and drain by the thoracic route. It is sometimes practicable to irritate the peritoneum surrounding the abscess area on the liver and parietes by rubbing it with a sponge or curette with a view to causing adhesions and walling off the abscess. After several days, the adhesions having formed, the operation is performed. This procedure should not be used when time is a factor and drainage is urgent.

- April 9. About 4 inches of the eighth rib in the mid-axillary line, right side, was resected. An incision was made through the pleura, and the edges of the pleura were sutured to the diaphragm. The incision was then carried through the diaphragm. The liver was pierced with a large hemostat and opened. About 2,000 c. c. of chocolate-colored pus was removed. Two large drainage tubes were placed in the abscess cavity.

Further course of the case.—Drainage became bile-colored. The abscess cavity was irrigated frequently with quinine bihydrochlorid solution. Smears of pus did not reveal the presence of *Entameba histolytica* until April 21, 12 days after draining. Drainage gradually lessened. Dakin solution was substituted for the quinine solution.

April 23. *Entameba histolytica* was found in pus, but the organisms were not motile.

July 1, 1920. Healing complete. Granted leave. Discharged to duty August 20, 1920.

Diagnosis.—Amebic abscess of the liver.

The diagnosis of solitary liver abscess presents no difficulty as a rule, but certain abscesses are so indefinite in their manifestations as to escape detection. The most suggestive signs are the history of tropical residence and attacks of dysentery, the latter fact often brought out only after close questioning or perhaps not at all. When added to this we find pain in the region of the liver, perhaps referred to the right shoulder; progressive enlargement of the liver; tenderness in right hypochondriac area; slight jaundice, chills, a prolonged fever, sleeping sweats, and a leucocytosis, the diagnosis is not difficult. One should also bear in mind the characteristic cough (pertussis hepatica); the physical signs of compression of the right lung, and the presence of ameba in the stools. The abscess may be latent for a long time or when only slightly active give rise to very definite symptoms.

As Manson has pointed out: "Golden rules in tropical practice are to think of hepatic abscess in all cases of progressive deterioration of health; and to suspect liver abscess in all obscure abdominal cases associated with evening rise of temperature, and this particularly if there be enlargement of or pain in the liver, leucocytosis, and a history of dysentery—not necessarily recent dysentery. If doubt exists, there should be no hesitation in having early recourse to the aspiration needle to clear up the diagnosis."

However, there is not any one symptom that is constant and to prove that the liver is involved may be very difficult indeed. It might here be pointed out that amebic abscess of the liver may occur any number of years after the primary amebic dysentery. A

case recently reported¹ occurred 30 years after residence in the Tropics. The activation of the ameba is brought about usually by refrigeration, alcoholism, or traumatism.

Case III. H. A. G. C. W. T. U. S. N.

Admitted with following history: While at a watering place near the city he dived from a height of 6 feet into what was thought to be water of sufficient depth. Struck his neck and right shoulder. Became helpless and had to be assisted from the water. He stated that "he felt numb from the neck down." Did not lose consciousness.

Examination.—Complete sensory and motor paralysis from the second rib (anteriorly) downward and from a corresponding point posteriorly. Paralysis, motor and sensory, of upper and lower extremities. Thermotactile anesthesia over these areas. Paralysis flaccid. Reflexes were absent. Head could be rotated, flexed, and extended, but these movements caused pain in the lowermost part of the neck. There were points of tenderness over the spinous processes of the fifth and sixth cervical vertebræ and over the second and third dorsal vertebræ. There was no bulging or depression at any point along the spinal column. The spinal processes had good alignment.

Spinal puncture.—The fluid escaped in rapid drops and consisted almost wholly of blood. Retention of urine and intestinal paresis were present. Outcome was fatal; the patient died of pulmonary edema the fifteenth day.

Roentgen ray examination.—The first eight plates made, giving an anterior-posterior view, did not show any evidence of vertebral fracture or any displacement of the vertebræ. Two lateral views through the cervical vertebræ did not show any fracture or displacement. The eighth and ninth plates (anterior-posterior views) showed a displacement downward of the body of the sixth cervical vertebra and a possible fracture.

The only desire in reporting this case is to point out the difficulty in securing satisfactory evidence by roentgenograms that the vertebræ are fractured or that there is a dislocation. This patient was very robust and the muscles and the soft tissues of the neck were well developed. Plates must be studied very carefully to bring out a slight dislocation or indistinct fracture.

Generally speaking, fluoroscopic examination is of scarcely any value in examinations of the spine because of the thickness of tissue and the slight degree of contrast that can be obtained. On account of the considerable number of bony projections and spinous proc-

¹ Mallory, W. J.: Jour. Am. Med. Assn., Dec. 26, 1920. p. 1774.

esses, together with the peculiar curvature of the column as a whole, it is frequently difficult to obtain plates depicting the vertebræ with sufficient accuracy for purposes of diagnosis. Unless care is taken to follow a definite procedure, information can not be gotten by comparison of plates. When lateral views are attempted, the superimposing of shadows becomes a factor, because it will be readily seen that slight changes in position may result in a very considerable deformation of the shadow outline.

It should be needless to point out that the patient should be moved and handled as little as possible, and then only with the greatest care. These injuries are not only extremely painful, but careless handling may bring about injury to the cord even if it was not present before examination.

It becomes very important from the standpoint of both prognosis and treatment to decide early whether or not there is serious cord injury. First it must be determined whether the cord is severed or partially divided, whether the injury is a wound of the cord or compression, and whether the compression is due to displacement of bone or to hemorrhage.

If there is complete division of the cord its union can not be hoped for. All that can be done is to make the patient comfortable, correct any deformity, and attend to the paralyzed organs. Operation in these cases can not restore function. If the cord has been partly severed and the displaced bone still compresses the cord, then the condition should be corrected by manipulation or by open operation.

Should pressure symptoms exist and there is no evidence of displacement of bone sufficient to produce cord injury, it is safe to assume that hemorrhage into the cord is responsible for the symptoms. In these instances the Roentgen ray is important and the difficulty of obtaining and interpreting the plates should be borne in mind. The prognosis will rest upon the Roentgen ray findings and the neurologic examination.

In hematomyelia with compression of the cord one should expect the paralysis to begin clearing up within 24 or 48 hours after the onset. Return of sensation is to be looked for soon and is a very hopeful sign. If there is no improvement in four or five days, it is a certainty that irreparable damage has been done and the outlook is grave.

Case IV. C. T. C. B. M. U. S. N.

This patient, a man of 35, was injured in a heavy sea off Tampico. He was thrown against some housing and struck the left side of the head. He was unconscious 48 hours; the history shows there was bleeding from the left ear. Since admission there have been no symptoms of basilar fracture, but he complains of tinnitus in the

left ear and that he does not hear well on that side at present. The tinnitus is now much less. He is annoyed slightly from disturbances of equilibrium, which have persisted three months after the injury.

In determining whether or not there is hearing for the voice the Dennert control is of value. This is accomplished by having the sound ear closed, when the voice is heard just as distinctly with the impaired ear closed or open. An otologist reported both drum membranes practically normal. In this instance there was no hearing in the left ear, for with the right ear closed the voice was heard just as well with the left ear closed as when it was left open. The vestibular mechanism was tested to determine whether there was destruction of the function of the labyrinth. The semicircular canals were stimulated by rotation. When rotation to the right was practiced nystagmus was very weak, lasting only 7 seconds. Rotation to the left produced nystagmus that lasted 20 seconds. Rotation to the right stimulates the semicircular canals of the left side, and vice versa.

At present it appears that he has suffered a fracture of the base which involved the petrous portion of the temporal bone and disturbed the function of the labyrinth of the left side.

Case V. W. M. Lt.

Admitted October 3, 1920.

Injured in a heavy sea four days prior to admission. The history is vague, the patient recalling very little that happened except that he was swept from the forecabin and was knocked with great force against deck housing. There was simple fracture of left femur at junction of upper third with lower two-thirds. Skiagraph showed overriding of 2 inches.

The scrotum was severely torn—in fact, there was almost complete avulsion of the scrotum. The left testicle was greatly enlarged and completely exposed. It contained necrotic and hemorrhagic areas. The right testicle was completely exposed, but only slightly swollen and showed no evidence of other traumatism. Much of the scrotal tissue was missing. A new covering was made for the left testicle by dissecting carefully in several directions. Enough skin and dartos were thus obtained to give this enlarged mass an almost complete covering. The scrotum was also brought over the right testicle by a little dissection and traction. Sutures were tightly placed and drainage provided for.

The treatment of the fracture of the femur presented some difficulty because of the proximity of the fracture to the scrotum. Plaster of Paris or the Thomas splint could not be used. The only alternative

was the use of some improvised splints and Buck's extension. A fairly satisfactory result has been obtained.

The recuperative powers of scrotal tissue and testicles were demonstrated here. There was slight infection, but it was controlled in about six days by means of dichloramin-T and Dakin's solution. After that healing progressed nicely. The left testicle regained its normal size, and both testicles had eventually a snug scrotal covering.

HYSTERIA IN THE NAVAL SERVICE.

By W. A. BLOEDORN, Lieutenant Commander, Medical Corps, United States Navy.¹

Hysteria in the naval service is by no means a rare condition, and its various manifestations are constantly being encountered. In fact, the rigors of military service produce a particularly suitable medium in which susceptible individuals may develop the symptoms of this disease.

As a means of escape from trying, distressing, or unbearable situations, it affords an outlet which, subconsciously seized on by the patient, eases the predicament in which he finds himself and permits him to avoid the issue. That this mechanism frequently saves the individual from more serious accidents, there can be little doubt. Under conditions which appear to be unbearable, several avenues of escape are probably available. Desertion, suicide, drugs, or alcohol may be the method of choice, depending on the tendencies, habits, and environment of the individual.

The fact remains, however, that service conditions not infrequently bring about situations which, to the person concerned, loom up on the horizon as gigantic and awful. The fact that their vision may be distorted or their perspective faulty does not alter the situation as far as they are concerned. What may appear as a trivial incident to their companions may also take on the significance of a tragedy when dwelt on, pondered over, and kept at its optimum temperature for development by continuous brooding.

For a long time hysteria was regarded as a disease peculiar to the female sex, but of recent years the almost equal liability of the male to this psychoneurosis has been demonstrated. The majority of these cases occur during adolescence and decrease in frequency as age advances.

For the proper development of this condition a suitable medium is essential. Individuals belonging to neuropathic families and who themselves are of unstable nervous make-up are particularly liable to develop hysteria when exposed to some of the inciting causes.

¹ U. S. Naval Hospital, Annapolis, Md.

The immediate cause may be emotional, traumatic, toxic, or following fatigue or overwork.

As regards the naval service, any or all of these factors may play a part. Suggestion or imitation of an hysterical case may precipitate an attack. Let us analyze the situation and the various factors that may enter into the production of an hysterical state.

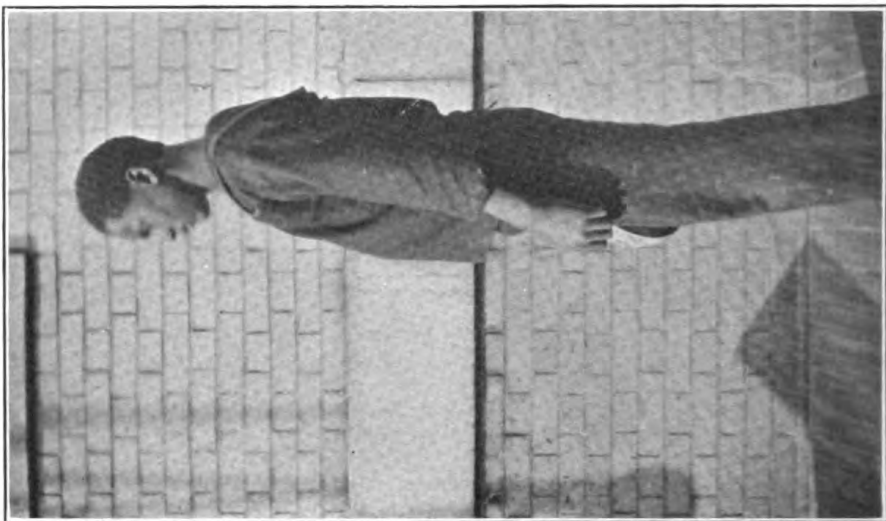
The average individual upon entering the naval service must readjust himself to an entirely new environment. The ease and completeness with which he makes this adjustment has an important bearing upon his future welfare and also upon his value to the service. The new recruit becomes immediately surrounded by the necessary regulations and restrictions. His hours of drill, of sleep, and of liberty are fixed and he must adjust himself to them. The necessary quality of discipline must be instilled, and habits of obedience, promptness, and cleanliness must be inculcated. The mental attitude which the recruit adopts toward these efforts to make him an efficient member of the organization has an important bearing upon his future course. It is a well-known fact that not all individuals are able to instill these qualities into the new recruit with the same degree of success. Not all individuals possess the same degree of tact, the ability to cooperate with, to inspire, to stimulate, and to encourage the newcomer to develop these necessary qualities.

In some cases the recruit, instead of adopting a receptive attitude toward these new precepts, may become resentful at what he considers an infringement upon his personal liberties and thereby lose the good effect of much effort in his behalf. The necessity of selecting individuals who possess these necessary qualifications for positions of supervision and command can not be overestimated. There can be no doubt that it is frequently within the power of a commanding officer to ease a difficult situation for a subordinate and prevent the development of a neurosis or perhaps a more serious disaster. While it is true that every effort is made to avoid recruiting the man with neurotic tendencies, the fact remains that these tendencies are frequently extremely difficult to detect and that individuals enter the service who do not have the necessary stamina and resistance to stand up under unusual strain. It may be that the officer or man gets along for several years without any evidence of a neurosis simply because the inciting cause has been wanting.

In peace times this condition is much less frequently met with. In time of war it causes an appreciable percentage of disability and may become a serious problem. The large number of cases of neuroses encountered in the late war by all of the combatant nations was a cause of much concern, and the number of derelicts still drifting in the wake of the World War is evidence of the inability of man to withstand situations created by war, which, while they neither kill



Showing nature of disability.



Result of suggestive therapeusis.

nor maim in a physical sense, still leave their mark on the individual in the form of a disabling neurosis. These men in many cases lived through periods, possibly of a few minutes or possibly of days or weeks, during which their environment was distasteful, terrifying, or repulsive, but in each case unendurable. No relief or avenue of escape being available, or compatible with their sense of duty, they subconsciously developed a neurosis which relieved the strain and eased the situation, but at the same time left them disabled and noneffective.

The form which this neurosis may assume depends somewhat on the inciting cause, but it may simulate practically any form of disease or disability. Deafness, blindness, loss of the senses of smell, taste, or touch, aphasia, paralysis, contractures or emotional disturbances are a few of its manifestations.

The neuroses of peace differ in no essential feature from those of war. The inciting cause may be more difficult to bring to light, but its effect is no less striking.

The following cases may serve to illustrate the type of case frequently met with in the naval service:

Case I. Age 19; colored; male; unmarried.

Complaint.—Pain along posterior cervical and upper dorsal regions and inability to stand in upright position.

Family history.—Negative.

Personal history.—Cerebro-spinal fever two years ago, at which time he received several intraspinal injections of antimeningitis serum; good recovery.

Present illness.—About three weeks ago the patient was confined to bed for three days with muscular pains in the lumbar region. Following this he was allowed up and appeared to be all right until two days before admission to hospital, when he suddenly noticed that he was unable to stand in an upright position, his body being flexed forward in the dorso-lumbar region, which position remained fairly fixed. He was able to walk about in this position, but all attempts to stand upright were unavailing. The patient was admitted to hospital with a diagnosis of acute arthritis.

Examination.—Hyperesthesia and tenderness over muscles from first to sixth cervical vertebræ were quite marked. There was free mobility of the head in all directions except posteriorly. The absence of all definite evidence of an organic lesion, together with the presence of hyperesthesia and contractures, suggested a hysterical basis for disability. It appears that the patient disliked his present duty very much and had been considering various means by which his environment could be changed. He had gotten the idea well fixed that it was impossible for him to continue on his present duty,

and had been in this state of mind for several weeks before the onset of his present illness.

Clinical course.—The contracture described persisted for two weeks and did not disappear during sleep.

It was determined to employ suggestive therapeusis through the medium of the ultra-violet ray. While no particular merit is ascribed to the ultra-violet ray itself, it is considered an excellent means of employing suggestion for the relief of these disabilities. It was possible in this case to entirely relieve the muscular spasm and to correct the existing deformity after one application of the ultra-violet ray, together with the necessary suggestion. The patient was returned to duty, and has been able to carry on his usual occupation.

The accompanying illustrations show the disability in this case at time of admission, and also the effect of suggestive therapeusis.

Case II. Age 25; white; male; unmarried.

Complaint.—Sudden loss of consciousness; tremors and nervousness.

Family history.—Mother died at the age of 40 from pneumonia; suffered from severe headaches.

One brother, age 29, also suffers from periodic headaches.

Personal history.—Measles, mumps, and chicken-pox in childhood. Suffered from left inguinal hernia and wore a truss up to 16 years of age, when hernia disappeared. Erysipelas in 1915; good recovery. Appendicitis in 1917; operation, good recovery. Gives history of fall from a chair in 1915, when he struck the back of the head and lost consciousness for a few minutes.

Present illness.—Began in January, 1920, when he was summoned as a witness in a murder trial and following which he became very nervous. About this time he also had some marital difficulties which he states are all settled at the present time. Was admitted to hospital in 1919, with diagnosis of neurasthenia, and returned to duty at the end of two weeks. About four months ago, while at sea, he had some difficulty about the performance of his duties. This trouble continued and became accentuated, and after a rather violent altercation, during which he was severely upbraided, he had a chill and fell over in an unconscious condition. This period of unconsciousness lasted about one hour, following which he was transferred to a hospital.

Physical examination.—Examination reveals a definite stocking anesthesia of the right upper extremity, extending upward to the shoulder girdle. Reflexes, both superficial and deep, are normal and there is no evidence of an organic lesion. It appears that the patient found his duty particularly distasteful, but could see no

means of escape from the situation. His relations with his commanding officer were particularly unpleasant and the difficulties appeared to become greater as time went on. There appeared to be no means of escape from his distasteful environment, and it is considered that his hysterical manifestation was a defensive reaction which allowed him to avoid the issue without more serious mishap.

Clinical course.—This anesthesia persisted for several weeks, with gradual improvement, and the patient's nervous condition and general state of apprehension were relieved by suggestion and reassurance as to the ultimate outcome and his future duties. Following a month's leave the patient was returned to duty in excellent condition.

This patient showed definite evidence of an unstable, nervous makeup, and it is not unlikely that this or a similar condition might recur if the proper inciting cause is again present.

Case III. Age 47; white; male; married.

Complaint.—Severe pain over eyes; photophobia and spasm of eyelids.

Family history.—Negative.

Personal history.—Negative.

Present illness.—About six months previously, while the patient was on duty at sea, on coming up from the lower decks to the upper deck, he stepped out into the bright sunlight and was looking upward at some work which was being done on one of the masts, when he suddenly noticed that his vision was blurred and that he had great difficulty in opening his eyelids. He immediately went below to his room and was admitted to the sick list. His disability at that time was considered to be due to retinitis. He was carried on the sick list for several months, with no apparent improvement.

Examination.—Upon admission to hospital examination revealed marked blepharospasm of both eyelids, so that the patient had considerable difficulty in walking about and would sometimes walk around holding his eyelids open with his fingers. At times he could walk about with the eyelids partly opened and facial muscles tense and twitching, giving the appearance of great effort on his part. Frequently this blepharospasm would suddenly recur and the patient would have great difficulty in getting about. At these times he would be apt to run against people on the sidewalk. However, he never suffered any injury during these periods. Photophobia was present in varying degrees at different times, and the patient appeared more at ease in a slightly darkened room.

Examination of the eyes failed to reveal definite evidence of organic disease which would account for his symptoms. Inquiry into conditions aboard ship leading up to the patient's present illness,

after several days, revealed causes which were sufficient in this case to reduce him to a state of noneffectiveness.

It appears that from the moment he reported aboard ship his relations with his commanding officer were unpleasant and antagonistic. He was immediately charged with being overtime and threatened with court-martial, although this procedure was never carried out. He stated that his environment during this period was almost unendurable. He considered every possible avenue of escape. Obtaining a few days' leave he went to his home and talked the situation over with his wife. He wanted to send in his resignation, but as he had no other immediate means of support he returned to the ship determined to face the ordeal. By this time he found his duties extremely irksome, and brooded over criticism and what he considered unjust orders until he had reached a point where it seemed impossible to go on. He even considered ending his life, so dark did the situation appear, but put away this means of escape as unworthy and incompatible with his sense of honor. Finally, following the assignment of a particularly disagreeable task, he went on deck, looked up at the mast in the bright sunlight, and subconsciously seized this means of escape, which no doubt was suggested by the automatic closing of his eyelids in the glare of the sun. He then returned to his stateroom, was placed on the sick list, and relieved from his duties. He states that immediately he felt more calm and peaceful. He was transferred to a hospital ashore.

Clinical course.—At the time of coming under observation blepharospasm was marked, and it was difficult for the patient to walk about. He spent most of his time sitting in a darkened room, but talked freely and answered questions readily regarding his ailment.

His predicament was explained to him and he was reassured and given suggestive therapeusis, with improvement in his condition. Shortly after this he was transferred and passed from under our observation.

These cases illustrate the manner in which hysteria is frequently brought about in the naval service and are by no means unusual. The reaction in these cases was protective in character and enabled the patients to subconsciously escape from situations which had become intolerable.

The symptoms of hysteria are usually divided into two groups; those which are persistent and which are called *stigmata* and those which are intermittent or transitory. The *stigmata* of hysteria are not necessarily present in all cases of hysteria, but when once developed tend to persist. They may be sensory, motor, or psychic, and include the various disturbances of sensation, the motor defects, which are usually unknown to the patient, and the mental *stigmata*, such as amnesia, aboulia, and suggestibility.

The transitory symptoms of hysteria include the convulsive attacks, the various paralyses and contractures, and the sensory accidents which are usually painful in nature.

Hysteria in the naval service differs in no essential detail from hysteria in civil life and its diagnosis can usually be established or eliminated by a careful examination. However, the diagnosis of hysteria does not rule out the presence of organic disease.

A CASE OF HYSTERICAL SPASTIC PARALYSIS OR CONTRACTURE.

By A. H. EHRENCLOU, Lieutenant, Medical Corps, United States Navy.

The hysteric is constantly with us. Indeed, the various guises and forms which the manifestations of hysteria take are almost as numerous as the symptoms in the field of medicine or the variations in human behavior. The following case from the surgical section is here reported, both because of its rather clear picture and because of the comparative completeness with which the details illustrate most of the features of the pathological mechanism.

The patient was referred to the surgical department of the hospital, suffering from a spastic contracture, in Velpeau's position, of the left arm, which had resulted from an injury to that member during a fall. It had been supposed that the extreme muscle spasm with fixation was due to a fracture, but the roentgenogram showed the bone structures intact and in normal relationship, with no evidence of damage even to the soft parts. Further absence of physical findings made the psychogenic factor most apparent.

In the family history both parents were alive and well, and the ancestry for several generations was American. The father was a moderately successful, Middle West farmer. Physically he had been well, but always had been a bed wetter. There was no history of mental or nervous conditions, no constitutional diseases or alcoholism. There were two sisters alive and well; two brothers, one of whom had always had "nervous headaches," but who were otherwise well. The patient was the second child. His birth was normal; dentition, talking, and walking occurred at normal ages; he had had measles, mumps, chicken-pox, and whooping cough in early childhood. In 1918 he went through a moderately severe attack of influenza. There were no known sequelæ from any of these diseases. He states that he received fair marks in school, had missed one whole year, leaving during the third high-school year at the age of 18 to go to work. In his eleventh year he was thrown from a falling horse and remained in a dazed, semiconscious state for about 10 minutes, although he did not fall on his head, nor was in any way injured. He could recall no consequences of this mishap. On another occasion he had sprained

his right wrist, necessitating its being carried loosely in a sling for a few days.

At the age of 13, while competing in a sack race, the boy fell and sustained a fracture of his left clavicle. This was treated by binding the left arm, flexed at the elbow, in the Velpeau position, tightly against the trunk so that it could not be moved in the slightest degree. His hand was closed within the bandage. This position was maintained for four weeks, after which the bandage was loosened and later removed, leaving the arm stiff for a few days before it finally relaxed.

Until the age of 7 the patient was a bed-wetter. Since then he has had nycturia 5 or 6 times and is often compelled to void every two hours in the daytime in order to prevent incontinence. He was subject at times to dizzy spells, had hot and cold flushes, and frequent dull, heavy frontal headaches. Attacks of spastic cramps in the muscles of his extremities were frequent after severe exertion. He stated that he was always easily excited, became restless, and at these times his hands were cold and moist and he sweated freely. Since early childhood he has become confused easily, accompanied by a tremor. As a child his play life was normal, childhood happy, with later moderate but normal social activities. However, he was always somewhat diffident as a child and slightly seclusive. He now plans a trade for the future. He sleeps soundly, but not excessively or long. He dreams very little, he states, and can not remember any dreams on awakening. Because of lack of cooperation on the part of the patient and the time limitation, analysis could not be made. He talks actively in his sleep, is often a sleepwalker, especially when a little fatigued; he has awakened while sleepwalking and found himself "out at the barn," a short distance from his sleeping apartment.

The patient was a well-built, well-nourished, fair-complexioned youth of 19, with firm muscles and warm, moist skin, except the hands, which were cold, moist, and slightly cyanosed and which later showed a tremor. He had been enlisted about two weeks and was at his post only four days. About 10 p. m. on the day of injury, while running to the lavatory from the moving-picture show, with some fear as to his ability to get there in time to prevent urinary incontinence, he tripped over a wire and fell face downward, striking on the ulnar surface of the partially flexed left forearm. He was dazed, felt dizzy and nauseated by the fall, and after attending to his needs, went to bed. There was no disturbance of the injured arm that he could later recall other than minor tenderness from the slight bruising—wherefore he held the arm in the flexed, protected position. At midnight he noticed stiffness of the fingers and wrist. In falling he did not strike his head. The next morning

he realized that his arm was immobile and later in the forenoon positively rigid and paralyzed beyond his power to move. He was seen by a doctor and a temporary splint applied. When examined on the morning of the second day after negative X-ray findings, the left forearm was flexed about 75° and the entire arm was held rigidly against the trunk. The hand was tightly clinched about the thumb. The muscle groups of the arm were set and tense and stood out under the skin. Any attempt to move the shoulder, elbow, wrist, or fingers from their set, rigid position met with intense resistance and brought on weeping and the complaint of severe pain, but despite this there seemed present a sense of complacent satisfaction in the disability when not handled. Stigmata of hysteria were abundantly found. There was general cutaneous hyperesthesia with anesthesia on the left side, particularly in the affected arm. He sweated profusely. Conjunctival, pharyngeal, and abdominal reflexes were absent. Other superficial reflexes were sluggish. The tendon reflexes were all hyperactive, but equal except as to the affected arm. Pupils and ocular muscles reacted normally. Facies and eyes had a far-away, abstract expression. There was dermographism, lasting 17 minutes and coarse tremor of the extended hands.

The attention of the patient was diverted by rapid questioning, and by a sudden movement of the shoulders both arms were twisted behind his back in the position known to wrestlers as the hammer lock. In this position, with the patient's mind still diverted, forcible flexion and extension of both elbows was commenced. This was at first strongly resisted in the disabled arm, but within five minutes the joint could be moved throughout its whole range. With the arm still behind his back the same methods were used on the arm and fingers. When the fingers were extended the palmar surfaces were found to be macerated from the long confinement in the cramped position. After about 10 minutes manipulation the attention of the patient was called to the fact that all his joints were being moved without pain or limitation of motion and he was told to move them himself. To his surprise he found that he had perfect motion in all the joints of his arm.

On further examination, two days later, the patient was negative for stigmata of syphilis, laboratory findings were negative, and there was no evidence of focal infection. By the Stanford Revision of the Binet scale he readily passed as of high-grade normal intelligence. The only wish element that could be obtained was that the patient had been engaged to be married for the past eight months. His father had promised to give him a start in life, and since he had only a two-year enlistment and was satisfied with the service he apparently was not worried or deeply anxious over this matter. He

heard from the girl regularly and there seemed to be no trouble in this regard, nor were there any other worries or conflicts that could be obtained by a moderate degree of analysis. He was of somewhat poor emotional control, had a neurotic facial expression, with a slight tic to some of the muscles of one side of the face. The skin of the face was slightly congested. There was a little note of opposition and superciliousness in his manner. There was a clearly marked egocentricity and a well-developed fear element in his personality makeup. The absent superficial reflexes and the localized anesthesia of the affected arm of the left side had disappeared, although the skin throughout was slightly hyperesthetic. The dermatographism lasted only four minutes and the tremor, which was very slight, had all but cleared up. Both hands were still rather bluish, cold, and moist. He had excellent functional control of the left arm. Subject was seen four months later, attending to his duties well with no return of the disturbance.

In this case there seems to be evident the pathological state of ready dissociability of hysterics, here easily initiated by a sudden trauma. One might assume that at the time of the first accident of the broken clavicle at the age of 13 there formed the complex with its motor and sensory integrations involving the musculature and skin of the affected arm. These may have been strongly placed and integrated with certain ideas around the emotions, probably, principally fear, and more or less firmly fixed in the subconscious during the several weeks of immobility of these muscle groups necessary for the repair of the fracture. The factor of repression was quite apparent, for it was only with considerable urging that the patient could be induced to remember this or other accidents involving considerable pain and their attendant details. The supposition in this case then seems to be that the sudden, entirely unexpected fall gave great stimulus to the complex of the former injury and its attendant emotion, wherefrom the energy or stimulus to overactivity of the motor centers of the affected muscle groups came through the integrated motor connections.

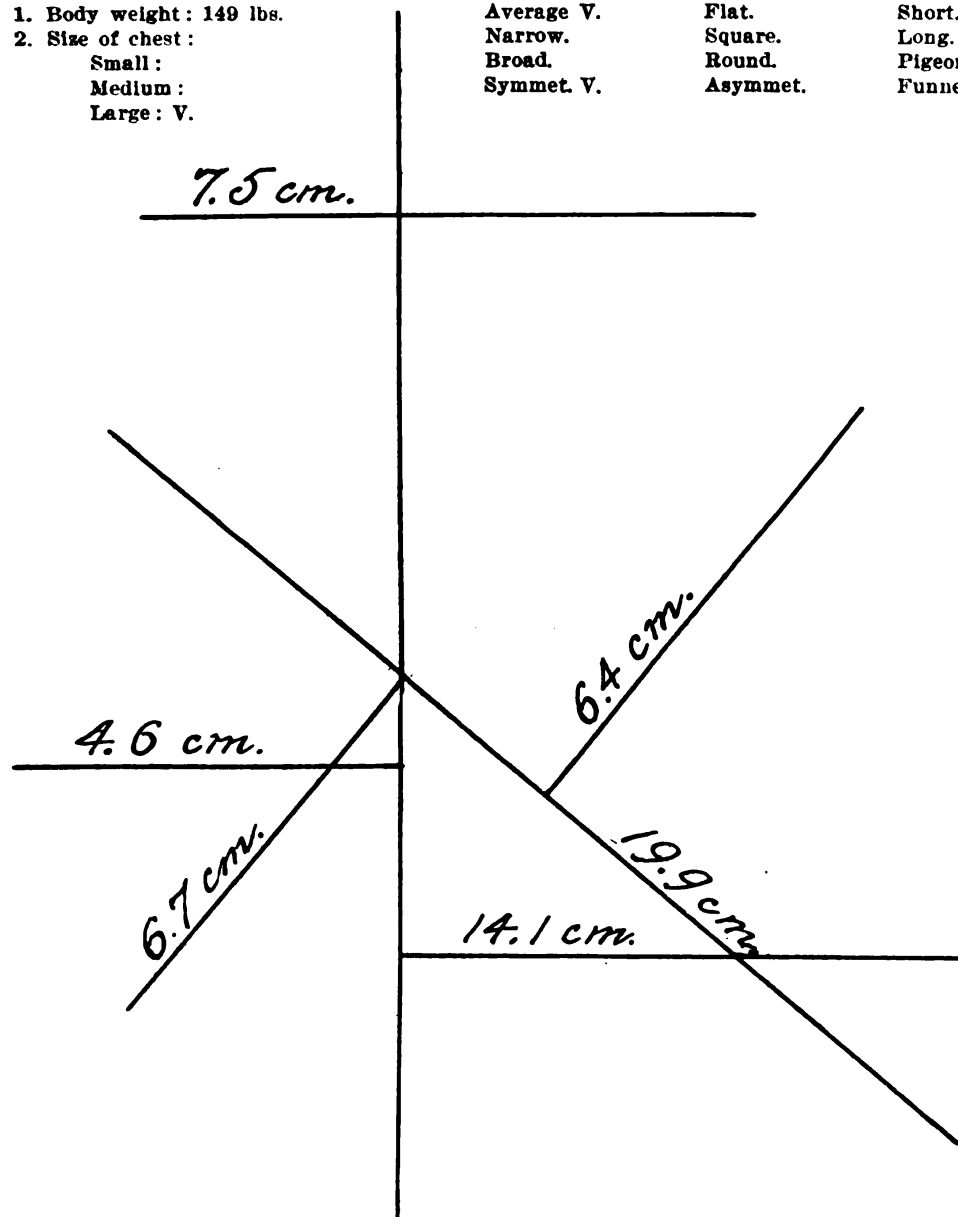
X-RAY PROCEDURE AND TECHNIQUE.

By I. E. JACOBS, Lieutenant Commander, Medical Corps, and C. B. WORSTER, Chief Pharmacist's Mate, United States Navy.

During the past few months, at the United States Naval Hospital, Chelsea, Mass., there has been an abundance of very interesting heart and lung conditions, such as chronic gas (phosgene and chlorine) poisoning, pneumonia, pleurisy with effusion, tuberculosis, bronchiectasis, syphilitic aortitis, and asthma, all of which have been fluoroscoped and have had either X-ray films or plates taken.

United States Naval Hospital,
Chelsea, Massachusetts.
Heart sheet.

No. 4. Rate: C. M. M. Date: 3/2/21. Ward 4-1.
Name: G. J. Age: 57.
Diagnosis: Arteriosclerosis. Shape of chest:
1. Body weight: 149 lbs. Average V. Flat. Short.
2. Size of chest: Narrow. Square. Long.
 Small: Broad. Round. Pigeon.
 Medium: Symmet. V. Asymmet. Funnel.
 Large: V.



3. Diaphragm: High. Med. V. Low.
4. Rate: Slow. M. V. Rapid.
5. Pulsation of aorta----- of Pul. Art.----- of Rt. auricle----- of Lt. auricle-----
of Lt. Vt.-----
6. Resp. Exc. of heart: Normal V. Limited. Absent.
7. Measurements: MR. 4.6. ML. 14.1. T. 18.7. L. 19.9. S. C. D. 7.5. Int.
Dia. Ch. 30 cm.
8. Roentgen diagnosis: Arteriosclerosis; Hypertrophy of the heart.
9. Remarks: Considering the age of the patient, with no definite increase in the diameter of the aorta in the oblique view as compared with that in the antero-posterior and with the sharp distinct cardiac outlines, and prominent aortic knot, arteriosclerosis must be considered first and syphilitic aortitis second.

Of this group we have selected 15 cases which show interesting X-ray pathology, and which are rather typical of what one is accustomed to see in a naval hospital. Chronic gas cases were selected from a series of 25 war-risk insurance patients, who were sent to this hospital with the diagnosis "Question of tuberculosis." Of these it seems best to demonstrate only those which not only show the most, but which give true and accurate histories of being gassed, because a great many of these patients who have served with the A. E. F. have many original ideas about the properties of gas, to which they ascribe their symptoms. The following cases show brief histories, physical examinations, X-ray interpretations, and diagnoses.

METHODS OF EXAMINATION.

For the past several months all chest cases have had a fluoroscopic and X-ray (film or plate) examination, and these have been interpreted in connection with the history and physical examination of the individual. In some few cases of emergency, or where the condition was such as not to warrant a complete examination, such as described, examination with a portable Englin X-ray apparatus has given very good results. But in all cases where it is possible combined methods should be used, as neither a fluoroscopic X-ray examination nor X-ray picture alone is entirely satisfactory. The above is an example of a heart chart which is used here, and one is now being prepared for the lungs, which will embody the main points of diagnostic importance. This chart is sent to the wards and a copy is kept for the files of the X-ray department.

A Roentgen examination of the heart is as follows: Under fluoroscopic screen an examination is first made in order to determine the general heart character; presence or absence of enlargement, abnormal pulsations, flabby borders. A tracing is then made on glass with a blue pencil in the anterior-posterior view and of the arch in the right oblique diameter. The excursions of the diaphragm are observed during normal and forced breathing, in order to rule out adhesions of the pericardium, and then a 7-foot plate is taken and the heart is measured in centimeters, as shown in the diagram below on the cardiac sheet.

To determine whether there is enlargement in the horizontal diameter, the technique used is that which has been worked out by Drs. R. Lee and E. Holmes at the Massachusetts General Hospital, and is as follows: If the transverse diameter (MR plus ML) is less than one-half the internal diameter of the chest wall, the heart is not enlarged; but if it is equal to or exceeds the internal diameter of the chest wall the reverse is true. This method is one of the best we have to determine cardiac hypertrophy, and it has been confirmed at autopsy by the above investigators.

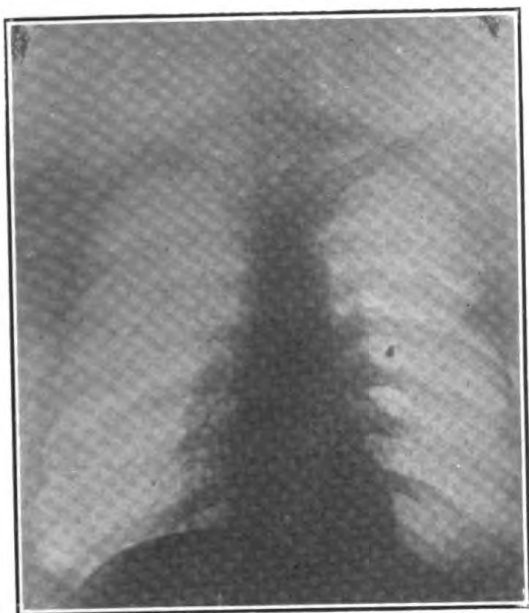


Fig. 1.—Findings of this date confirm those of previous examinations. Lung markings are very prominent throughout, more marked on the right than the left, with a tendency to branching formation in the region of the 2nd interspaces. The shadow of the right descending bronchus is prominent and shows dilatation of the smaller bronchioles. Heart is of the vertical type; interspaces are widened. Diagnosis: Bronchial asthma, chronic bronchitis or ptosis.

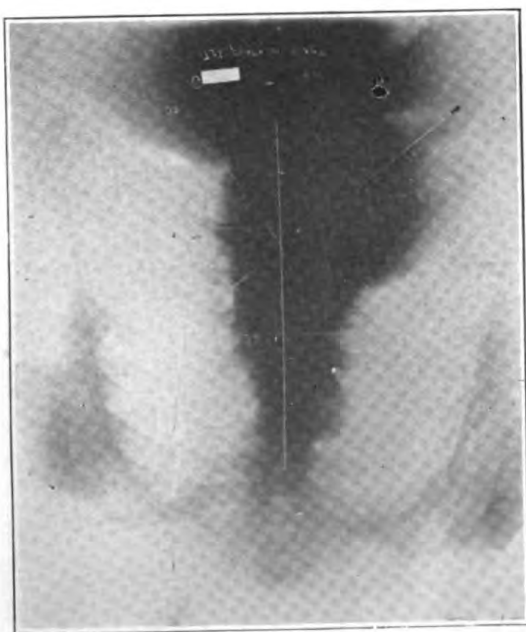


Fig. 2.—X-rays confirm the fluoroscopic observation, showing in addition a prominent aortic knob and a moderate dilatation in the region of the ascending aorta. Interpretation: Considering the age of the patient with definite increase in size of the aorta, in the oblique view and with distinct sharp cardiac outline, arteriosclerosis must be considered first and syphilitic aortitis second.

526-1

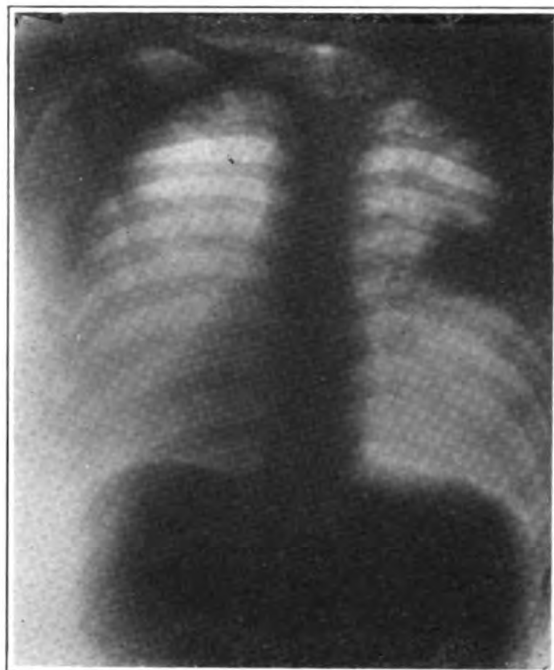


Fig. 3.—In the right middle lobe there is a well-defined shadow of increased density 7.5 cm. by 4 cm., which extends from the periphery toward the hilum shadow, presenting the characteristics of lobar pneumonia. Diagnosis: Lobar pneumonia.

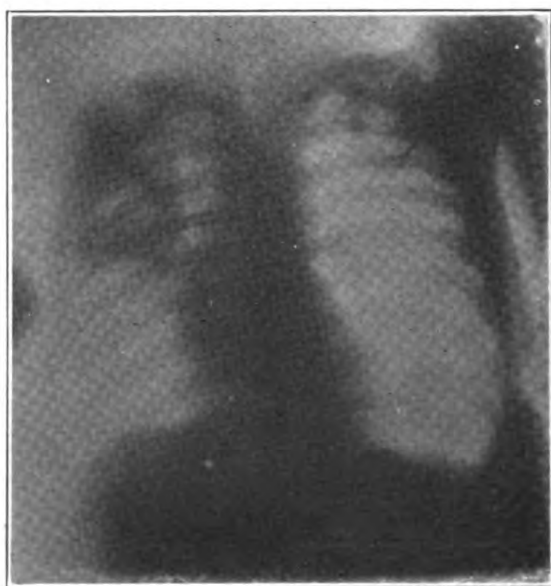


Fig. 4.—Shows a shadow of increased density occupying most of the upper and part of the middle lobe, right. This was taken 24 hours after the first (No. 3), and at this time there were present definite physical signs of consolidation.

526-2

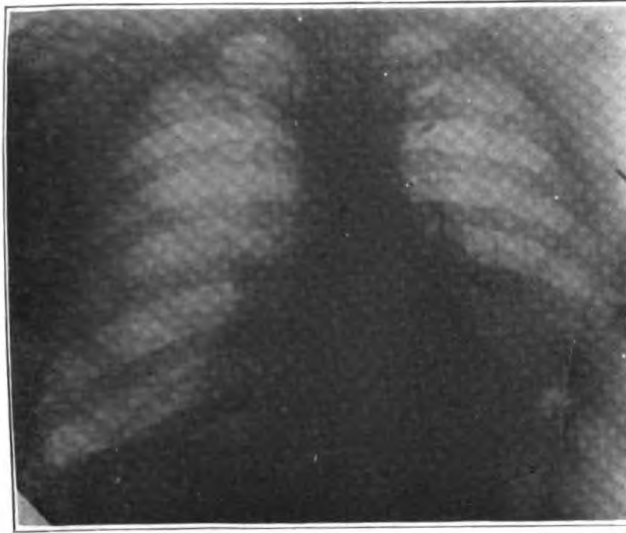


Fig. 5.—The lung markings and hilus shadows are markedly prominent and there are many calcified glands seen throughout both lung roots. The markings are of the branching type, present a moderate degree of beading and run well toward the periphery. In the upper portion of the left lower lobe there is an irregular shadow of increased density, 2.5 cm. in diameter. The shadow of the left descending bronchus is more prominent than normal, having a mottled appearance in its lower aspect. Heart is displaced to the left. Diagnosis: Bronchiectasis and process of infiltration, left lower lobe. Old calcified glands.

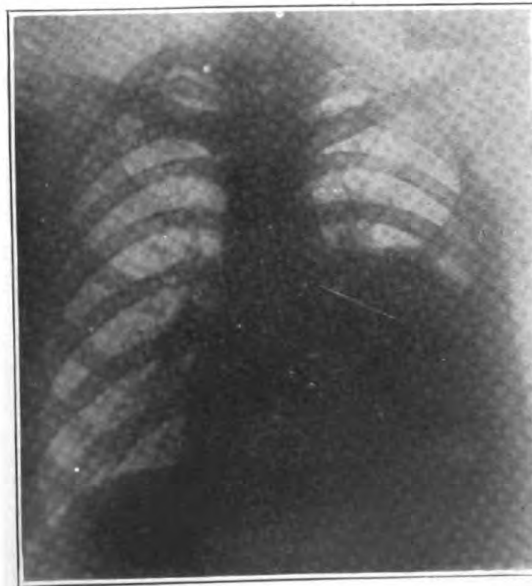


Fig. 6.—There is a shadow of increased density extending from the 3rd rib to the left base, which obliterates the diaphragm and costophrenic angle on that side. The heart is displaced to the right. Diagnosis: Pleurisy with effusion (left).

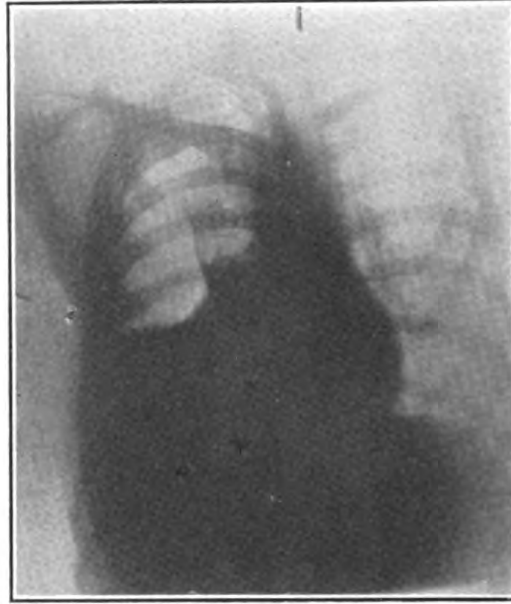


Fig. 7.—The right apex is less radiant than the left and, beginning with the 6th rib, there is a definite shadow of increased density extending down to the base on the right side, obliterating the costo-phrenic angle on that side. The left border of the heart is within normal limits. Diagnosis: Empyema, post-operative. Thickened pleura.

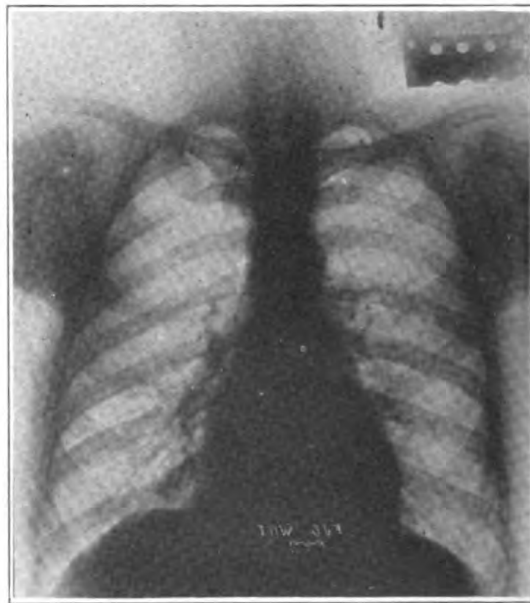


Fig. 8.—Both apices appear slightly dull. The lung markings and hilus shadows are prominent and thickened. The diaphragm, costo-phrenic angles and excursions of the diaphragm are within normal limits. There are no signs of tuberculosis present. This is consistent with the picture following gas intoxication.

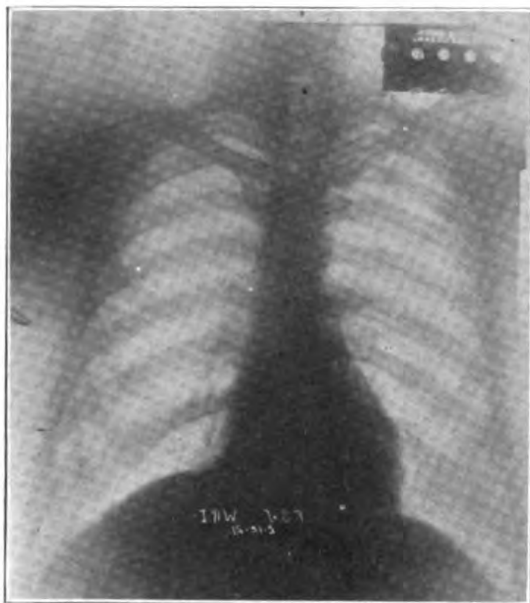


Fig. 9.—The apices are within normal limits. Lung markings and hilus shadows are moderately prominent and thickened. There are several old calcified glands present at both lung roots. The diaphragm, its excursions and costo-phrenic angles are within normal limits. Diagnosis: Gas intoxication, old tubercular glands.

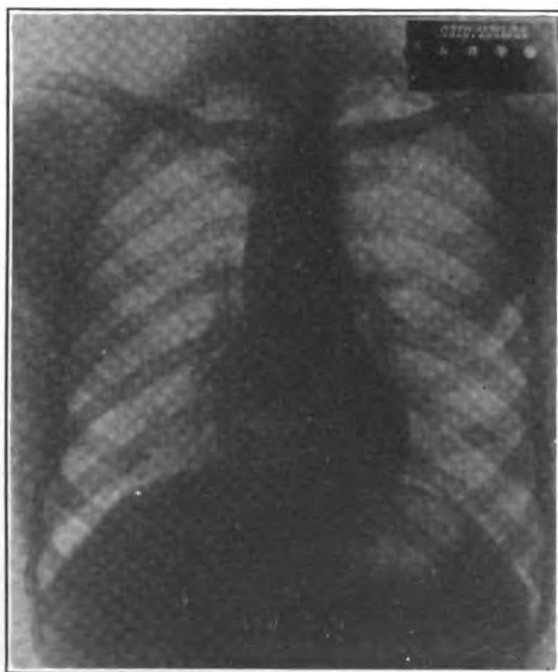


Fig. 10.—The right apex is less radiant than the left. The hilus shadows and lung markings are increased throughout. There are many old calcified glands present. In the region of the 2nd right rib there is a group of old calcified glands. There are many old calcified glands in the right lung roots. In the region of the shadow of the ascending aorta there is a shadow of increased density 3.5 cm. by 1.5 cm. The diaphragm and costo-phrenic angles are clear. Diagnosis: Old calcified tubercular glands. No signs of active tuberculosis present. The possibility of gas intoxication must be considered.

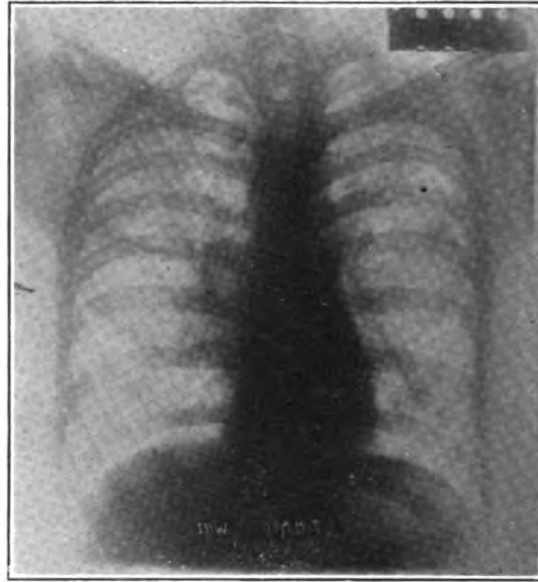


Fig. 11.—The X-ray shows a moderate degree of infiltration of the right upper lobe and to a lesser degree of the left upper lobe. The lung roots, right side, are very prominent and thickened and the lung markings run from it well into the apices and toward the periphery. In the region of the 4th right rib there is an area of calcification about 1 cm. in diameter. The heart is of the vertical type and the lung interspaces are widened. Diagnosis: Pulmonary tuberculosis. Asthma.

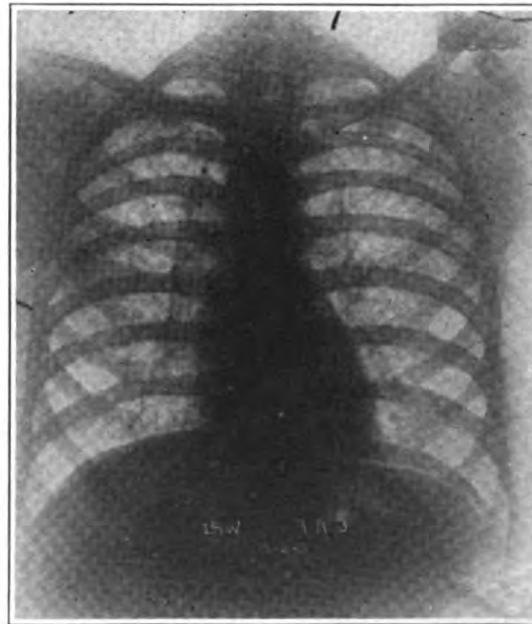


Fig. 12.—Fluoroscopic examination shows dullness of both apices; the right does not light up on coughing as well as the left; the hilus shadows are thickened and prominent, and the right diaphragm does not move as well as the left. The costo-phrenic angles are clear; the posterior mediastinal space is dull in its upper half. X-rays confirm fluoroscopic observation, showing fairly general active pulmonary tuberculosis throughout both lungs.

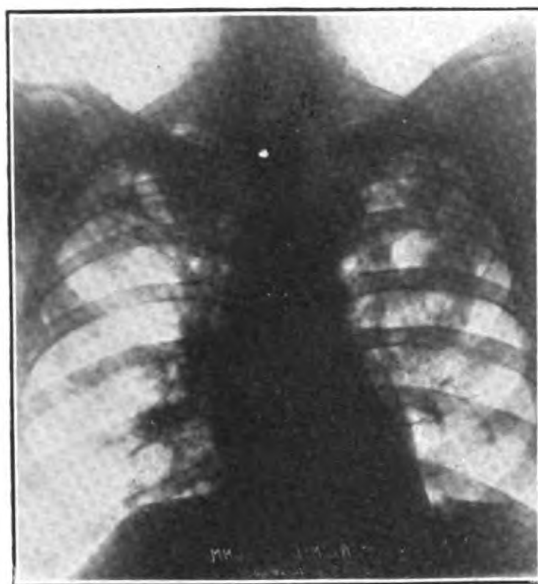


Fig. 13.—Both apices are dull; the left more than the right and there are several cavities seen throughout both lungs. On the right the dullness is most marked in the region of 2nd and 3rd ribs and becomes continuous with the right ascending bronchus. In the region of 6th rib, near the descending bronchus, there is a definite area of increased density 2 cm. in circumference. On the left the dullness extends from 2nd to 4th ribs and is most prominent in the midclavicular line. Lung markings are prominent throughout with beading and mottling. Many calcified glands present. Diaphragm high and irregular on the right being attached to a calcified gland $1\frac{1}{2}$ cm. in diameter. Diagnosis: Pulmonary tuberculosis.



Fig. 14.—This X-ray confirming previous observations shows a marked involvement of the whole right upper lobe and moderate involvement of the upper left lobe. In addition, there is a shadow of increased density extending from the middle of the right lung down to the base, obliterating the diaphragm and costophrenic angle on that side. Diagnosis: Pulmonary tuberculosis and pleurisy with effusion.

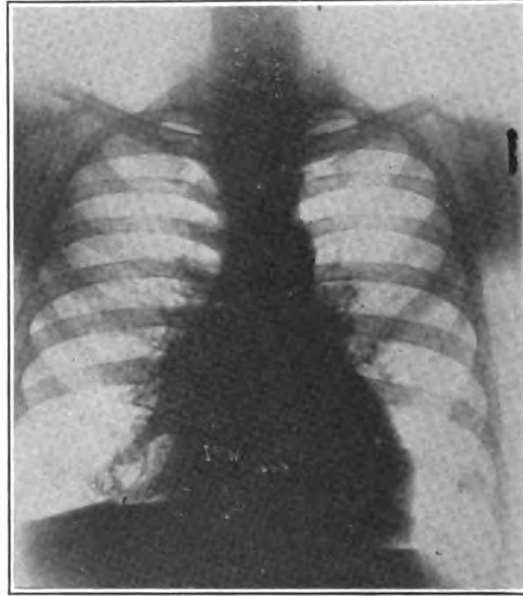


Fig. 15.—Apices appear normal. Both hilus shadows are markedly prominent and thickened, especially the one on the right. The shadow of the right descending bronchus is more prominent and thickened than normal. The diaphragm, its excursions, and costophrenic angles are normal. The shadow of the heart appears enlarged. Diagnosis: Gas intoxication. Enlarged heart (?).

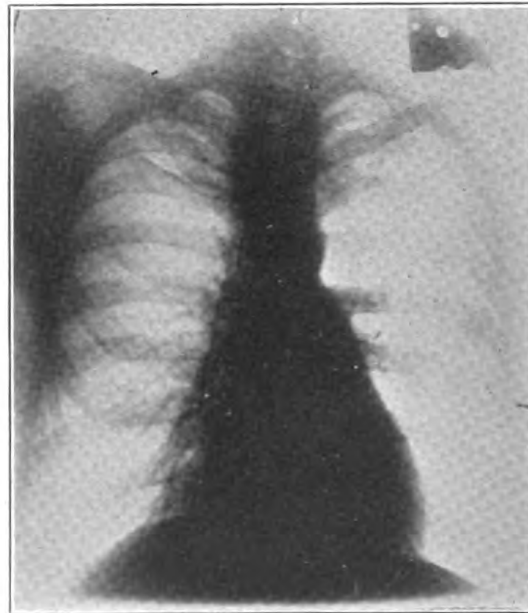


Fig. 16.—The right apex and lower $\frac{3}{4}$ of right lung are less radiant than the left. The hilus shadow and the lung markings are distinctly prominent, much more on the right than left. At the right lung root there is marked peribronchial thickening and the shadow of the right descending bronchus is prominent, thickened and mottled in appearance.

INTERPRETATIONS AND DIAGNOSES.

In every case an interpretation is always made and a diagnosis is rendered where possible. The report is then typewritten and sent to the ward to be placed on the patient's chart, and a copy is kept for the department's files. This, of course, is the most important part of a radiologist's work, and requires not only some skill in observation but also a knowledge of pathology and differential diagnosis. Then, again, the result must be given in such language or terms that it may be properly interpreted by the clinician in order that he may use it in his routine work. It is believed that X-ray and fluoroscopic language must be developed in the near future, which will bridge over the chasm still existing between the radiologist on the one hand and the clinician on the other. Furthermore, the clinician must have some training in the elements of roentgenology before he will be ready to interpret properly the language used by the radiologist. It is no more reasonable to expect a clinician to be able to do this without special training than to expect him to interpret laboratory procedures, such as n. p. n. of the blood, complement fixation tests, pathological examinations, etc. Another faulty idea still existing among many clinicians is that it is only necessary to have a picture taken and the diagnosis will positively be made. In some cases this is very true, as in fractures or with a large amount of fluid in the chest, but unfortunately in many cases no definite diagnosis can be given, and, therefore, the only thing to do is to give the findings and the possibilities in the individual case. Here again we can not expect the roentgenologist to give an exact diagnosis in every case any more than we can expect the laboratory workers or pathologists to do the same.

IMPORTANCE OF THE X-RAY LABORATORY IN A NAVAL HOSPITAL.

For the past four months at this hospital 30 per cent of all the cases admitted have sent requests to the X-ray department and probably 25 per cent have been influenced by these examinations. It is safe to say that the correct diagnosis in 5 per cent of them would never have been made without help from this department, and in 25 per cent of them X-ray furnished additional evidence, which made the diagnosis easier. Only one case can be mentioned in which the X-ray examination was a detriment in making the diagnosis. This was in a case of pleurisy with effusion, which gave a picture of consolidation rather than of fluid, but here the physical signs were very characteristic of fluid, and although thoracic aspiration was negative on three occasions, the fourth time the needle solved the problem.

TECHNIQUE.

The general technique used at this hospital is a combination of the different ones used at various institutions in Greater Boston. In order to gain this knowledge, visits were made to these places and the good points of X-ray technique obtained, which were later substituted for those formerly in use here, where improvement was shown to follow. To a man in this work it should be something more than just pressing a certain button to take a picture, as he should know what takes place, and why, when making the different contacts.

POSITION AND EXPOSURES FOR CHESTS AND HEARTS.

A patient is never subjected to more than 1,200 M. A. seconds for any case, and with this dose never more often than every two weeks.

Chests.—All plates and films of chests and hearts are taken postero-anterior. In chest work the patient brings his shoulders down on the plate, which throws the shadow of the scapula off the lung field. The tube is tilted about 5° downward.

Exposure.—4-inch gap—80 M. A. through the tube for three seconds—distance 28 inches.

Hearts.—A seidlitz powder is given 20 minutes before the picture is to be taken, to fill the cardiac end of the stomach with gas, thus throwing the apex and left ventricle of the heart out in bold relief. The pictures are taken at a distance of 7 feet to avoid distortion, and the tube is focused just below the supracardiac dullness, using single screen and plate.

Exposure.—4-inch gap, 40 M. A., 10 to 12 seconds.

Fluoroscopy of chest.—It is the general tendency of most technicians to use too much penetration in this work, and therefore most of the outlines of the heart borders and lung markings are lost to the radiologist. Here a 3-inch gap is used, and 3 to 4 M. A. through the tube, which, as a rule, is enough to get very good detail on the screen. Of course there should be no set rule for this kind of work, as much depends upon the experience and powers of observation of the roentgenologist.

Technique of reduction.—First, all the chest films or plates (14 by 17 inches) are used in this work, and, through the medium of an Eastman No. 2 reducing camera, lantern slides are prepared, 4 by $3\frac{1}{4}$ inches. For plates it has been found by experience that the best time of exposure was 30 seconds, while for films 20 to 25 seconds have always given very good results.

INTERPRETATION OF ABDOMINAL MUSCULAR RIGIDITY.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

Rigidity of the muscles of the abdominal wall is a sign of great value in the diagnosis of many intra-abdominal conditions. After pain and tenderness, it is frequently the most valuable localizing sign. Textbooks make little or no mention of lesions outside the peritoneum which may cause this phenomenon, except certain acute infections such as tetanus, pneumonia, or cerebro-spinal fever, in which it is a minor point and not likely to cause confusion.

Two cases were recently admitted to the surgical service of the United States Naval Hospital, Mare Island, Calif., with diagnoses of intra-abdominal conditions, in each of which the muscular rigidity was a prominent sign and carried great weight in making the diagnosis. In each case the lesion was found to be outside the peritoneum and confined to the neighborhood of the rigid muscles. These two cases, admitted within a few hours of each other, emphasize the importance of estimating the quality as well as the presence of muscular rigidity in palpating the abdominal wall.

Case I. A young man admitted with the diagnosis of a strangulated left inguinal hernia.

Three days before, he had noticed pain and tenderness in the left inguinal region and these had become much worse during the last 24 hours. The pain was severe, he had vomited, and his bowels had moved three times within the hour. Muscular rigidity was marked on the left side of the abdomen and a small painful swelling could be felt over the internal inguinal ring. Inspection showed no evidence of local inflammation or injury.

A diagnosis of strangulated hernia seemed justified by these findings. But his general appearance was distinctly septic; his temperature 101°, his leucocytes 24,000, and the vomiting soon ceased instead of growing worse. There was no distention of the abdomen and the rigidity was too intense and too sharply localized. He had an infected wound of the forearm, caused by an injury about three weeks before.

Our conclusion was that he had a metastatic abscess of the muscular layers of the abdominal wall. An incision was made above Poupart's ligament, the muscle fibers were separated, and the abscess was found beneath the rectus and transversalis muscles. He was treated by the Carrell-Dakin technic and rapidly recovered.

Case II. A young man admitted with the diagnosis of a ruptured appendix.

There was a history of pain in the right lower quadrant, with vomiting, beginning 24 hours before admission. The temperature was 101.6° and the pulse 110. There was tenderness on palpation

of the right side of the abdomen and distinct muscular rigidity. Leucocytes were 24,000, with 79 per cent polymorphonuclears. The skin showed no evidence of inflammation or injury.

On first examination this patient presented the characteristic symptoms of appendicitis. But he was pale and exsanguinated in appearance and the rigidity was felt not so much over the rectus as over the area of the internal oblique. Extreme rigidity of the muscles on the right side of the abdomen with entire absence of rigidity on the left side does not fit into the picture of appendicitis either before or after rupture.

Further examination developed a history of a slight injury to the right groin, occurring 48 hours before the onset of the symptoms. He also stated that he had nearly bled to death some years before, following the extraction of a tooth. One brother had died of hemorrhage following the extraction of a tooth and another of hemorrhage caused by a blow on the neck. His blood coagulation time was found to be nine minutes and his red cells 3,300,000. We considered it probable that the injury had caused rupture of a small vessel in one of the muscular layers of the abdominal wall, with persistent bleeding into a fascial space. Operation seemed unadvisable.

The next day his temperature was 96.4°, his pulse 142 and almost imperceptible. By this time there was a definite swelling in the right flank, following the outlines of the lower half of the internal oblique muscle. This swelling was firm, moderately painful to the touch, and dull on percussion. Blood transfusion was done, 250 mls being given. This was quickly followed by a very great improvement in his condition. Transfusion was repeated on the following day, with equally gratifying results. From that time recovery was rapid. On the seventh day the blood coagulation time was three minutes, the red cells 4,400,000, and the leucocytes 12,000.

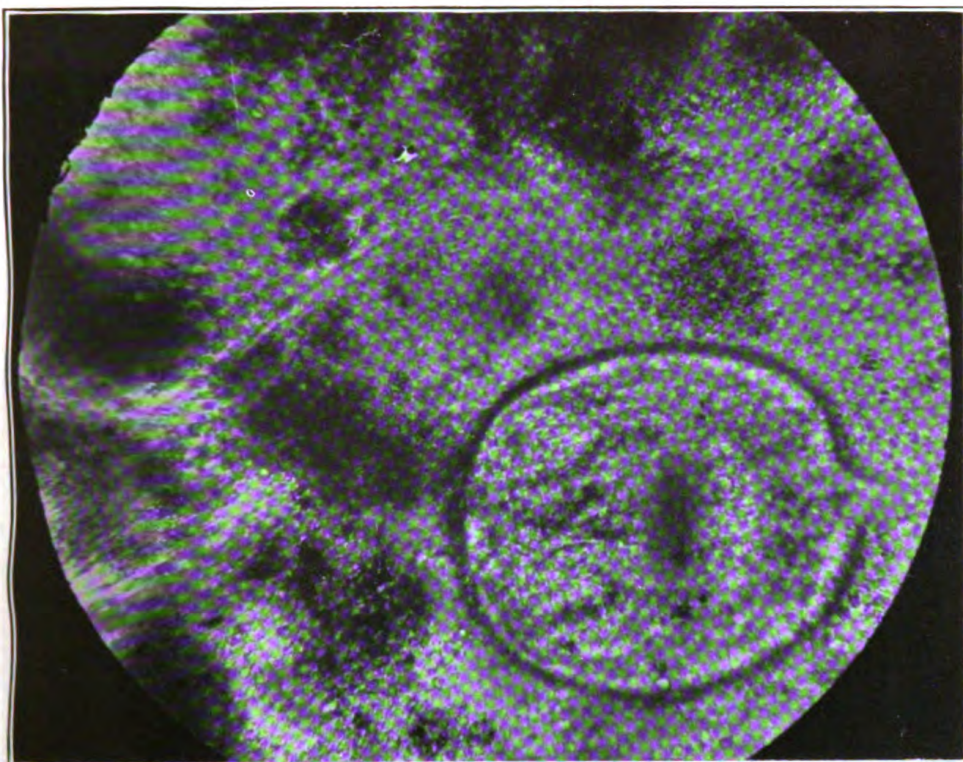
Conclusion.—We must be suspicious of rigidity that is too intense or too sharply delimited. Voluntary contraction must be differentiated from the reflex. Induration of the muscle must be excluded in interpreting the muscular rigidity.

A CASE OF ECHINOCOCCUS CYST.

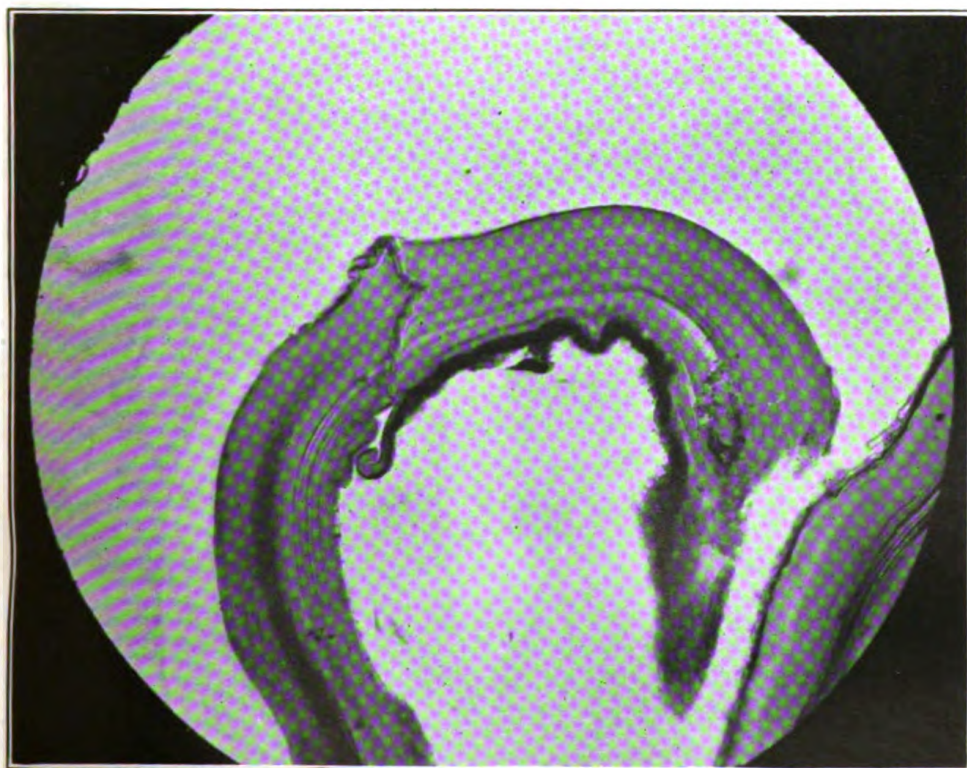
By C. S. NORBURN, Lieutenant, Medical Corps, United States Navy.

The patient was a supernumerary in the surgical ward of the United States Naval Hospital, Philadelphia, Pa., being treated for the War Risk Insurance Bureau.

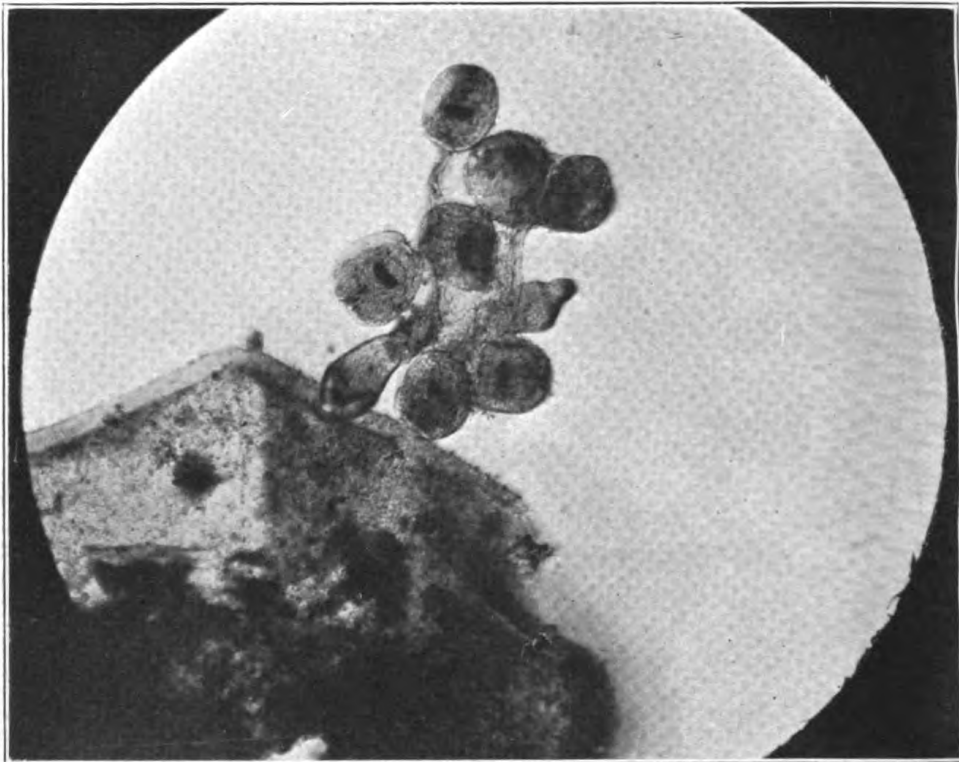
Eight years ago the patient, who had previously been employed on a farm in Italy, came to America and worked as a laborer and mill hand until 1917, when he enlisted in the Army and served on the



Echinococcus cyst showing scolex highly magnified.



Echinococcus cyst showing wall. Note the external laminated layer and internal germinal layer.



531 Echinococcus cyst wall with a ruptured brood capsule showing scolices.

Mexican border in connection with a pack train. In the spring of 1918 he suffered with generalized pain in the abdomen. Appendectomy was performed and, according to the man's statement, a cyst of the liver was removed at the time. He has never felt really well since. There is no history of fever, cough, nervous disturbance, or urticaria. He has been weak, obstinately constipated, often dizzy, and has had a voracious appetite. He is 28 years of age, a native of southern Italy.

The family history is negative.

Five days prior to the present examination he began to experience severe pain in the left hypogastrium.

The present condition is as follows: Well developed and well nourished. Heart and lungs normal. Reflexes normal. Fine tremor of fingers and tongue. Glandular system not involved. The abdomen is neither rigid nor tender. There is a small tumor in the right rectus muscle above the level of the umbilicus. A mass can be detected in the left hypochondriac region three fingers' breadth below the costal margin, apparently the spleen. Temperature, pulse, and respiration are normal. The Wassermann examination is negative. No malarial parasites found in the blood. Urine negative. The blood count is:

Date.	Red.	White.	Polymorphonuclears.	Small lymphocytes.	Large lymphocytes.	Large mononuclear.	Eosin.
			<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Jan. 10, 1921.....	4, 870, 000	6, 800	63	32	3	0	0
Jan. 14, 1921.....	3, 860, 000	6, 600	59	34	7	0	0
Jan. 18, 1921.....	4, 180, 000	8, 300	65	31	4	0	1
Feb. 2, 1921.....	.....	18, 200	79	18	1	.....	1
Feb. 3, 1921 ¹.....	.....	18, 600	.....	.....	.....	.....	.....
Feb. 7, 1921.....	.....	12, 000	75	22	2	.....	.....

¹ Blood negative for malaria.

Fixation test for hydatid requested, but no antigen available. The X-ray plate is negative except for elevation of left diaphragmatic line. This elevation is even and uniform.

At 6 a. m. on February 2, while at home, the patient had an epileptiform seizure. Nervousness and sensations of chilliness followed. There is marked swelling of the face and over the abdomen. The tongue is thick. There is a general puffiness of the skin, but no urticaria. No other abdominal symptoms. Temperature 103, respiration 18. Patient put to bed.

February 3, 1921. Chill at 8 a. m.; temperature remained at 100.2, pulse 112, respiration 28 throughout the day. Dizziness and sweating.

February 7. Temperature, pulse, and respiration have been normal since February 3. The patient is nervous and complains of tingling in the fingers.

February 11. Patient has improved but suffers with hot flushes. There have been slight afternoon elevations of temperature.

February 16. Operation. The abdominal cavity contained a cystic tumor attached to the posterior sheath of the rectus above the umbilicus and to the intestines. The wall of the cyst was of dense fibrinous structure. The lining was white, loose, and friable. (This portion was sent to the laboratory, United States Naval Medical School, Washington, D. C.) The sac contained clear colorless fluid. (Sample sent to laboratory.) The cyst was somewhat loculated. Numerous small cysts of similar character were present attached to the peritoneal wall of the small intestines. Raised yellowish white spots about 0.5 cm. in diameter could be seen attached to the intestinal wall.

Another large cyst, which contained a quart of fluid, was attached to the posterior abdominal wall in the left hypochondriac region. The spleen came to just below the costal margin. It and the upper part of the left abdominal cavity were involved in a mass of adhesions. The liver showed the mottling of chronic inflammation.

The microscopic examination of specimens was made at the laboratory of the United States Naval Medical School, Washington, D. C. Diagnosis of echinococcus cyst was confirmed by finding the characteristic curled, two-layered cyst wall (laminated and germinal layers), the brood capsules and scolices. The accompanying illustrations are from microphotographs made at the school.

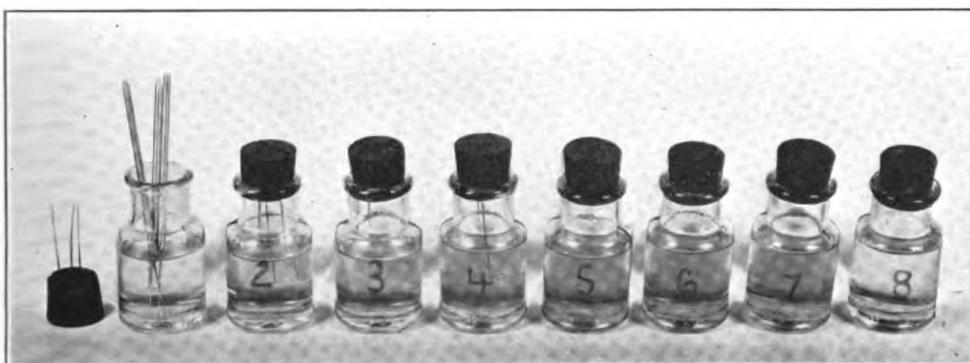
SURGICAL INSTRUMENTS WHICH WILL WITHSTAND THE ACTION OF CORROSIVES.

By G. C. THOMAS, Lieutenant Commander, Medical Corps, United States Navy.

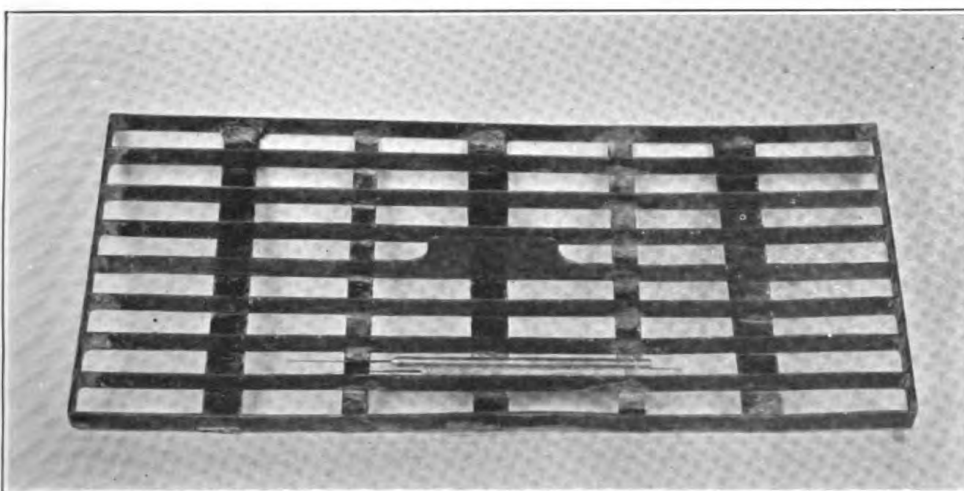
An alloy fulfilling all the requirements of an ideal material for the manufacture of surgical instruments has been discovered and patented by Commander James J. Manning, United States Navy, under the name of Manning Everedge alloy.

During the past four months the medical department of the U. S. S. *Delaware* has had an opportunity to try out surgical instruments made of this metal. These instruments were made on board ship and consisted of two bistouries and one scalpel. In addition we had a spatula made for use in the dispensary.

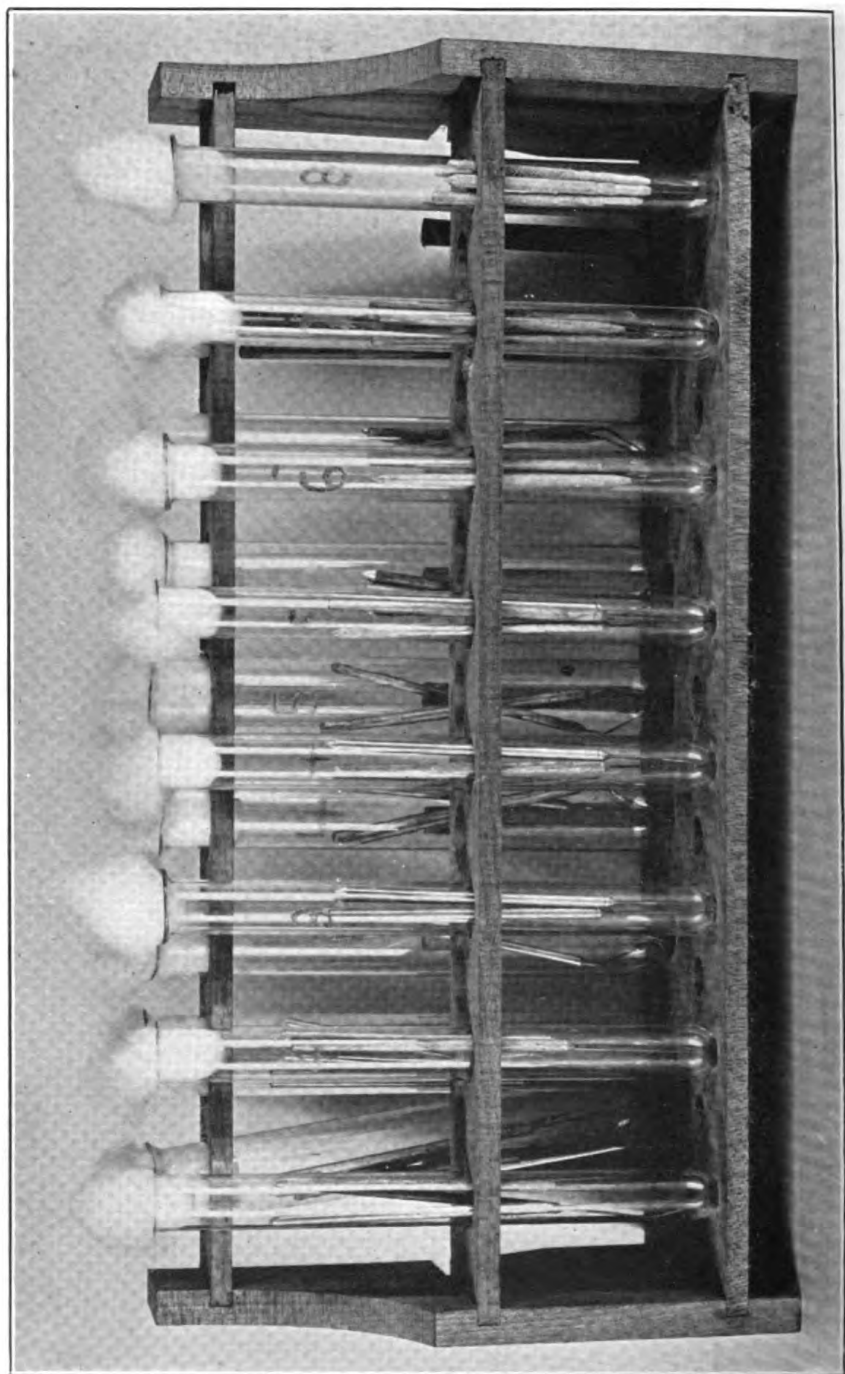
The results of these trials were remarkable. The alloy has all the advantages of steel or any other metal or alloy at present in use for the manufacture of instruments, and in addition has a number of



Bottles containing alcohol and almond oil, used as bracket table receptacles for instruments in use.



Sterilizing and drying compartment tray.



Test tubes and stands, numbered tubes corresponding to numbered bottles and compartments in the sterilizing tray.

533

advantages of its own. The cost of production is less than that of ordinary steel and very much less than that of other materials which are used for similar purposes.

It has a beautiful natural luster and does not require plating. It will take an excellent cutting edge and will retain this edge under conditions that would render a steel instrument unfit for use.

Neither bichloride of mercury in the usual solutions nor tincture of iodine will affect the edge or injure the luster. For minor surgery, instruments may be disinfected by being immersed in tincture of iodine without any apparent injury to the material. The metal is practically noncorrodible at ordinary temperatures. Ordinary methods of sterilization have no deleterious effects, even if the usual amount of care is not exercised.

Among its many other advantages is its high heat-resisting quality. The temper is retained in a surprising degree. It is very malleable and ductile. For these reasons wire made from this substance could probably be used to replace platinum in making loops for laboratory use. It would also be an excellent material to replace silver wire in bonework, owing to its high tensile strength. As it does not require plating, it is ideal for the manufacture of sounds and catheters.

The spatula referred to above has been used in preparing yellow oxide of mercury ointment, iodine ointment, and other preparations in the making of which it is impossible to use ordinary metal spatulas. The spatula was in no way injured and the preparations were excellent and were used with satisfactory results.

It is believed that there is a wonderful field for this alloy and that when further trials are carried out it will easily prove its worth.

ASEPTIC TECHNIQUE FOR CANAL INSTRUMENTS.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

The method of Dr. Arthur B. Crane for handling canal instruments during the operation of enlarging root canals has proved of such value that an attempt has been made to incorporate it with a technic which would be practicable under service conditions, in view of the fact that dental officers are not equipped with autoclaves and therefore must sterilize by boiling.

In order to have instruments free from contamination and immediately available for use, the following system is suggested: Eight medium size and eight large size test tubes are used, with a stand to hold them. Each size is numbered from 1 to 8 with a stone in the engine; the marks are made near the tops and rubbed over

with a wax pencil such as is used for marking on glass, to make them easily distinguishable.

The medium size tubes are for straight instruments, while the large sizes are for instruments which have been bent at 45° and about three-quarters of an inch from the working points, the latter for use in the posterior canals, both series of tubes to contain the same number and sizes of respective instruments.

The test tubes are boiled, rinsed with alcohol, thoroughly dried, and fitted with absorbent cotton plugs.

The following instruments have been arbitrarily selected for the tubes as numbered:

- No. 1—pathfinders—3 sizes.
- No. 2—apexographers—3 sizes.
- No. 3—Rhein pics—3 sizes.
- No. 4—Rat-tail file—3 smaller sizes.
- No. 5—Rat-tail file—3 larger sizes.
- No. 6—Kerr canal-files—3 smaller sizes.
- No. 7—Kerr canal-files—3 larger sizes.
- No. 8—Crane canal openers.

The instruments in each tube are marked for easy differentiation on the ends of the handles as follows: The end of the handle of the finest instrument in each tube is ground to a point with a carborundum stone, the next finest is flattened on two sides, and the remaining instrument is left as supplied by the manufacturer.

A metal tray, about one-fourth of an inch in height, which will easily fit in the sterilizer, is made of German silver strips, and this is divided into eight longitudinal compartments or divisions for keeping separate the instruments from the respective tubes while they are being sterilized.

The instruments are marked as above indicated, arranged according to the numbers on the test tubes, placed in their respective compartments in the sterilizing tray, and boiled. Upon removing from the sterilizer, drain the tray and then pass it over the flame of the large alcohol lamp, thus drying thoroughly the handles of the instruments, taking care of course not to subject the tempered portions of the instruments to much heat. When they are seen to be free from moisture remove the plug from No. 1 tube, and with a pair of flamed or sterile pliers take the instruments individually from No. 1 compartment of the tray, and put in No. 1 tube, working points down, replacing plug after the three instruments are in the tube. Place the remaining instruments in the tubes corresponding to the compartment numbers.

Eight 1-ounce wide-mouthed cork-stoppered bottles are numbered from 1 to 8, and filled with the mixture advocated by Dr. Crane, nine parts of alcohol and one part of oil of sweet almonds.

When the instruments are to be used remove the corks, and place the bottles of alcohol and almond oil in a convenient position, remove plug from No. 1 tube, invert the tube sufficiently to cause the handles of the three instruments to project, grasp these and transfer points down to bottle No. 1, repeat with the instruments from tube No. 2 to bottle No. 2, etc.

During the operation the instruments are used from the bottles and returned to them, until the operation is completed, whereupon for sterilization transfer the instruments from No. 1 bottle to No. 1 compartment in the sterilizing tray, No. 2 to No. 2, etc., boil, dry, and return to tubes.

The above system was followed for several months, then the solutions of alcohol and almond oil in bottles Nos. 6 and 7 were cultured for bacteria and all cultures proved negative.

To prevent the possibility of contamination of the handles of the instruments by the edges of the mouths of the bottles, it is suggested that the sides of the corks be moistened once in two weeks with a few drops of a 5 per cent solution of dichloramine-T in chlorcosane.

TRAUMATA CAUSED BY A FALL FROM A GREAT HEIGHT.

By H. H. LANE, Lieutenant Commander, Medical Corps, United States Navy.

The following autopsy findings in the case of an aviator killed by falling from a height of 1,600 feet and landing in water fully 10 fathoms deep are considered of interest.

The body, recovered several days after the accident, was considerably swollen. The eyes and tongue protruded. There were evidences of hemorrhage from both ears; dislocation of the second and third cervical vertebræ, but no fracture of the skull; multiple fractures of the superior maxilla involving the palate bone; multiple fractures of the inferior maxilla. Apparently the head was flexed on the chest at the moment of striking the water, so that the force of the impact traveled along the jaws, fracturing them, and then forcing the vertebræ apart. In both upper and lower jaws the teeth, in groups of two or three held together by the alveolar process, were loose in the mouth.

The arms and chest showed neither bruises nor fractures. The sternum and ribs were intact. A laceration 8 cm. long, about 6 cm. anterior to and to the left of the anus, was found extending up alongside of the rectum, between it and the bladder and into the peritoneal cavity.

The scrotum and penis were distended with gas. The left hip was dislocated upward and backward. The right femur was fractured

in the middle third. There were varicose veins on the inner side of both thighs.

The straps of the puttees were broken and the soles of both shoes were torn off. There were compound fractures of both bones of both legs just above the shoe tops, the proximal fragments projecting anteriorly.

On opening the abdomen, the intestines were found intact and practically empty; the bladder was torn along the posterior surface from fundus to base. The kidneys showed no gross lesions. A tear 10 cm. long extended down the anterior surface of the stomach from the lesser to the greater curvature. The liver, particularly the right lobe, was torn in every direction. The gall-bladder was intact. The spleen was ruptured on its inferior and posterior surfaces. The pericardium was ruptured, and the left heart was laid wide open, a tear involving the auricle and ventricle and passing through the mitral orifice. The lungs were crackling and showed no evidence of injury.

ADMINISTRATION OF NEOSALVARSAN.

By J. B. BOSTICK, Lieutenant, Medical Corps, United States Navy.

Without entering into a discussion of indications and contraindications, but considering only the technique of administration, it may be stated that the chief dangers and difficulties in giving neosalvarsan are:

- (1) The drug is contaminated by air in an imperfectly sealed tube and becomes oxidized or altered;
- (2) The drug becomes oxidized or altered prior to administration after ampule is opened;
- (3) The solution is not delivered into the venous circulation.

To obviate the first danger the drug is closely inspected for lumpiness, adhesion to ampule or discoloration. Placing the tubes in alcohol or Harrington's solution will sometimes demonstrate a leak not otherwise noted, the alcohol penetrating a flaw or crack in the glass more readily than water and causing a more manifest lumping or discoloration of the powder.

To escape the second danger all that favors oxidation should be avoided as much as possible. The chief factors involving oxidation are air, time between opening the ampule and injecting the solution, and the temperature of the water used. To minimize the foregoing factors one should open the ampule at the last possible moment when everything else is ready and use only very cold sterile freshly distilled water (i. e., not aerated), or very cold redistilled water now furnished in ampules by the medical storehouses. The water is drawn

up into a 10-mil glass syringe with a large-bore needle; the neosalvarsan ampule (tested as above) is opened and the water injected forcibly into the ampule with a rotating motion of the syringe so as to churn up the contents in the water until the ampule is filled. In this way the powder is entirely dissolved in a few seconds without causing any sticky lumps that dissolve slowly. This solution is at once drawn back into the syringe and injected into the prepared vein. A larger syringe may be used and further dilutions made in it by drawing the dissolved drug up into the desired amount of water left in the syringe. The ampule will usually not hold even 10 mils. The real dilution made in and by the blood itself depends on the amount of blood passing through the selected vein and the time taken in injecting the drug. The aqueous solution being cold, it seems better to have it rather concentrated and the real dilution made in the blood stream itself by injecting it slowly. For this reason the vein in the vicinity should not be compressed by the hand or barrel of the syringe but the blood allowed to flow freely, carrying the solution along into the general circulation as it is being injected. A small point in favor of about a 10-mil solution is that it is usually about the specific gravity of the blood when the average dose is given. If the specific gravity of the solution is the same as that of the blood the latter regurgitates as a column back into the syringe and is at once reinjected. If the blood is heavier or lighter than the solution it sinks or rises in the syringe away from the needle and remains in the syringe until the last of the solution is injected.

Sometimes for some unknown reason the solution will not clear but remains opaque or turbid. The products of different manufacturers have different colors or shades, varying from amber to lemon yellow. Sometimes this is true of different samples of the same product. Some observers claim the salt deteriorates with age. The shade of the solution varies also with the dilution, of course. Sometimes a solution seems cloudy because the ampule is not clean on the outside or else has become frosted by being cold and precipitating moisture on the outside. The syringe should be new or only used for neosalvarsan work. One syphilologist found his solution would remain clear in a new syringe and become turbid in one formerly used for mercury injection.

The third difficulty is usually almost nonexistent but sometimes is quite manifest. The vein may be found quite easily day after day, and when one thinks one's technique perfect in all cases a patient is encountered who very seriously disturbs that overconfident feeling. The difference is chiefly anatomical. Conditions vary as to the size and sharpness of the needle, the size of the vein, the blood pressure in the vein, the amount and character of the subcutaneous fat around the vein, the thickness and toughness of the skin, venous layers and

adventitia, and as to the mobility of vein itself under the skin. Success varies also with the light available and the skin disinfectant used.

Different operators advise different tactics or technique. Some say go into the skin over the vein and directly through the wall; some puncture the skin at the side of the vein. Some advocate two steps, i. e., one plunge of the needle through the skin, take bearings as to the position of the vein and needle point and then pierce the vein. The best procedure doubtless depends upon the various conditions mentioned above.

The best indication of having reached the lumen of the vein is to see the blood regurgitate into the glass syringe. Also, most patients claim they can "taste" the arsenic almost as soon as the injection is begun. To have the patient report it as soon as tasted gives him something to divert his mind from the actual discomfort and serves as an indication that the solution is going into the circulation and not into the tissues, where absorption would be slower and the taste not reported. Any prominent vein may be selected, but it is usually found on the upper anterior forearm. The median basilic is often the most prominent, but in the old blood-letting days the underlying brachial artery was sometimes reached by too deep an incision. However, other things being equal, it is easier to pass a needle up in the lumen of a vein on the rotundity of the inner forearm than in the depression of the antecubital space.

It is best to make tension on the skin with one hand and go through it with a needle directly over the vein, and then, if it is movable under the skin and slips away from the needle point, to enter the vein from the side most convenient. Sometimes the needle point can be seen to dimple and follow the venous wall a millimeter or more before it will engage and puncture. Sometimes the wall is so resistant that the needle point can be heard to burst through it. Rarely the recoil of a tough movable vein pierced on the side will cause the needle to pass through the opposite wall also, thus transfixing the entire vessel. If a valvular nodule of the vein presents itself the needle will often engage and enter it more readily and easily than in the internodular portion or main shaft of the vein. Also, and for the same reason, in the angle of a branch or bifurcation of a vein is a good site of approach. In any event, the needle should enter the vein in the direction of the blood stream or toward the heart, so as to avoid encountering one of these same valve leaflets or venous branches inside the vein and diverting the needle point out of the vein again. A rather large, blunt-cut needle is better than a small sharp one which is more likely to pass through or transfix the blood vessel. A larger one permits more rapid regurgitation. And if the

apex of the point is sharp, one will engage the vessel wall almost as readily as the other. After the point engages the wall a depression of the barrel of the syringe with a motion like that of a shoemaker's sewing awl will prevent transfixion of the vessel. The needles should all be closely inspected prior to sterilization at least as to uniformity of sharpness. After one is used it should immediately be washed out in clear water to get rid of not only the solution remaining in it but also the regurgitated blood, which usually leaves the syringe last, and hence is in the needle. It is best also to avoid reinjecting this blood if possible. On account of this blood, the syringe should be cleaned and sterilized for each patient. Two syringes are enough where a whole class of patients are treated at one seance, as is usually the case in the Navy, the syringes being used and resterilized alternately.

In fat subjects the veins are especially difficult to find and more likely to be transfixed, especially if the fat is firm. In such patients it is difficult to get the veins distended enough to make them clearly visible. There are several aids to this end, viz: Allow the arm to hang over the edge of the table before applying the tourniquet, or else have the patient swing the arm with a centrifugal motion. Also do not apply the tourniquet so tight as to stop the arterial circulation, as there is a tendency to do when the veins are hard to demonstrate, for it is the arterial supply that distends the obstructed venous return. Repeatedly making a tight fist after the tourniquet is applied increases the tension and distension by driving blood from the deep to the superficial veins. A vein, especially a movable one, may be too tense, so that the point can not dimple it for penetration. The remedy is obvious.

Painting the entire surface with tincture of iodine masks the color of the vein. A 4 per cent alcoholic picric-acid solution is equally or more efficacious and tends to make the veins appear green. A colorless antiseptic could be used, but the patient feels that more care has been exercised if something visible is used. Picric acid is colorless under artificial light. Iodine spots can be made along the course of the vein, the edge of one of these pierced, and the position of the needle point and the vein observed under the clear skin beyond. Light crossing the course of a slightly raised vein will produce a shadow that makes its location more clearly visible. A vein that can't be seen can sometimes be felt by the sensation of its resiliency.

If the vein is not reached immediately, try another site on the same vein at once, for the blood pressure causes capillary effusion into the tissues and soon masks the landmarks, rendering the vessel even more difficult to find. If the second attempt is a failure, the tourniquet should be released within a few seconds after the first puncture is made and the other arm tried.

Sometimes after the lumen of the blood vessel is reached and injection begun the needle will slip out and the solution begin to form a visible tumor in the tissues over the vein. If this occurs during the injection it is probably due to an inadvertent movement either on the part of the operator or of the patient. If at the beginning of the injection, it may be from relaxation of the tourniquet or the patient's fist or both. A distended blood vessel is also lengthened and hence more tortuous. When the tension is relieved the vessel is therefore correspondingly shortened and straightened and may draw itself away from the needle. When a needle thus slips out of a vein from any cause it is also advisable to reinsert it in a vein of the opposite arm in order to avoid the hematoma formed by reapplication of the tourniquet. To prevent the needle slipping out, most writers advise passing it further along the channel of the vein after piercing the wall. This is in practice not so necessary as was formerly the case when only the slower gravity method of administration was in vogue. A hematoma is to be avoided, for it looks bad and also renders invisible a beginning tumor caused by escape of the solution into the tissues when the needle has transfixed or slipped from the vein. Such a hematoma may organize and remain or form a lump that resolves slowly. It may become infected and break down in spite of asepsis or at best leave a discoloration that passes through most of the colors of the rainbow, inspiring anything but hope in the heart of observing shipmates who see it or in that of the operator himself on the "next Tuesday" when the process is to be repeated.

DIET DEFICIENCY IN VINCENT'S ANGINA.

By C. H. MORRIS, Lieutenant, Dental Corps, United States Navy.

It is an old proverb that says "Prevention is better than cure." To-day we know that prevention is economic. Prevention is the rational method of combating diseases; but until such time as we are able to prevent, we must meet the invasion of infecting bacteria on their own ground, searching at the same time for the cause, or causes, which make such infection possible.

The influence of diet as a predisposing factor throughout a period preceding the infection, as well as during the treatment of conditions of the oral cavity connected with pyorrhea, is one of extreme importance and one frequently overlooked or entirely ignored by the dental surgeon. Consequently, with this point of view in mind, may be considered a number of facts established in connection with the infection differentiated by the name of Vincent's angina, or, as it has been termed, "spirochetel pyorrhea."

In the first place, Vincent's angina is an affliction of the masses; an infection in civil life most commonly found among the poorer

classes of society and in military service prevalent where large numbers of men are assembled together, dwelling in close proximity to each other and subsisting on the same rations. This peculiarity is emphasized by the fact that Vincent's angina is a disturbance rarely met with in civilian dental practice, while to the military dental surgeon its treatment may be one of daily routine. Indeed, numerous civilian practitioners will testify that throughout a wide experience they have never knowingly seen a case of this disease. These things are significant, and passing by the manner in which this disease is acquired with the simple statement that it is transmissible, and that conditions for the infection being favorable the fusiform bacillus and the spirilla of Vincent are no respecters of age, race, class, or color, we may proceed to look for such differences as do exist, between individuals apparently so exempt and others who unfortunately are not.

Investigation shows these differences to be principally those of diet and hygiene and, as it is the purpose of the writer to dwell especially upon diet deficiency in this connection, the latter difference may be laid aside for the present. Further investigation shows that the difference in the diet of those well-to-do individuals composing the clientèle of a modern dental practice and of those less favored but more numerous persons of whom we speak as the "masses" is largely a deficiency in the varieties of food containing in the greatest degree the much needed "water soluble" vitamins (fresh vegetables and fruits) in the dietary of the latter.

Again, among our military forces in France during the late war, these food items were not only exceedingly scarce but often unobtainable for long periods, and Vincent's angina flourished with such malignity as to become almost a scourge, while in our home military establishments, where vegetables and fruits had a conspicuous place on the menu, cases of Vincent's angina were proportionately rare. This latter condition holds good to-day with our present military forces now on a peace basis, a large proportion of the cases of Vincent's angina presented for treatment being traceable directly to an original overseas infection.

For the further consideration of this line of study, the following table has been compiled from 80 cases of Vincent's angina treated by the writer at several stations in France during the summer of 1918:

Rank of rating.	Number of cases.
Enlisted men (1st, 2d, 3d class)	74
Chief petty officers	4
Ensigns	2
Other commissioned officers	0
Total	80

As may be seen from this table, which is arranged according to grades, 74 cases (92½ per cent) of this infection occurred in the mouths of enlisted men who were subsisting on the regulation mess, in which, despite all efforts to overcome the deficiency, fresh vegetables and fruits formed a negligible quantity. Four cases (5 per cent) were men rated as chief petty officers, who had, as is customary in the Navy, a private mess of their own, consisting of the regular issue of rations and in addition thereto such extras and delicacies as the members of the mess cared to furnish at their own expense. The two cases (2½ per cent) recorded in which the patients were ensigns were exceptional. One had been but recently promoted from an enlisted status, and the other, while subsisting in the officers' wardroom mess, was an excessive meat eater and one who, by his own admission, cared but little for either vegetables or fruits.

It seemed worthy of note that during the writer's experience of overseas duty during the war no commissioned officers excepting the two mentioned were treated for this disease. These cases, which are not selected, but given in toto, are grouped in this manner for the purpose of showing the relative susceptibility to infection as related to difference in diet.

With the military forces at the front no such differences existed. Commissioned officers of all ranks and enlisted men as well were compelled by circumstances to subsist on a common ration. Living in a despoiled country, far from their base of supplies, canned beef, bacon, beans, and preserved foods generally became their staples, and their "hidden enemies," the *Spirocheta Vincenti* and the *Bacillus fusiformis* attacked them all without fear or favor.

It is not the purpose of this paper to take up or discuss the relative merits of any method of treatment more than to say that whatever line is followed, proper correction of diet will prove its worth; also that for purposes of study a number of cases have been successfully treated by attention to a corrective diet alone.

The writer by no means claims that the infection of Vincent's angina is made possible solely because of diet deficiency, but desires to call attention to the obvious fact that this disease is most prevalent where diet deficiency exists, and expresses the belief that correction and maintenance of a properly balanced diet will go far toward its prevention.

VINCENT'S INFECTION OF THE GUMS AND BUCCAL MEMBRANES.

By J. B. GOODALL, Lieutenant (J. g.), Dental Corps, United States Naval Reserve Force.

Unusual opportunities were afforded the dental department of the United States Naval Hospital, New York, N. Y., during the past 10 months to make a thorough and comprehensive study of the many

infections of the gums and buccal mucosa, including the manifestations of the Vincent infections.

The *Bacillus fusiformis* and the *Spirochæta* of Vincent are not confined entirely to the throat, but may also be present in an ulcerated or membranous inflammation of the gums or musosa. These infections cause a stomatitis and a gingivitis, which in some cases are widely spread over the gums, about the necks of the teeth, and in the interproximal spaces. The ulcerated condition of the soft parts is generally in the muco-buccal fold in the region of the last molars, more frequently on the lower than the upper jaws.

In advanced cases the gums are very sensitive, swollen, and ulcerated at the necks of the teeth. They are covered with a very foul smelling exudation, bleed very readily on the slightest irritation, and at times the bleeding may extend to the entire area that is affected. Often a diphtheroid appearance presents itself on the surface of the ulcerated area, and in the early stages can only be differentiated by bacteriological studies. Ill-fitting crowns, bridges, and fillings are the points where the disease makes its first appearance.

The lesions may be acute or chronic. There is seldom any change in temperature, and the diet does not seem to play any part in the etiology.

The experienced examiner can easily differentiate between this infection and pyorrhea alveolaris. The clinical findings are readily confirmed by microscopical examinations. The etiology, treatment, and prognosis are also entirely different.

The treatment consists of a thorough cleaning of the mouth with a good antiseptic spray from a small-tube atomizer, so that it reaches the interproximal spaces and otherwise inaccessible parts. The mouth is packed with cotton rolls or gauze, and salvarsan applied freely on the buccal lingual sides of the teeth and gums. After this has been done three times for the first few days, the gums are thoroughly curetted with a spear-shaped excavator. This treatment is continued until all the ulcerated surface has been removed. As a rule the infection can be cured in from five to nine days. There is a tendency to early recurrence unless the disease is entirely eradicated.

In the more chronic cases it is necessary to administer a full dose (0.4 gm.) of salvarsan intravenously twice a week for three weeks, and follow this with local arsenic treatments. Often the infection is so severe that even with this intensive arsenic treatment improvement is a very slow process. In cases of this kind a complicating pyorrheal infection is present.

The specific treatment in this infection is the use of arsenic, as this drug is antagonistic to most forms of *Spirochæta*. The most useful remedy we can employ in and about the mouth is liquor potassii ar-

senitis. If this is used two or three times a day and the ulcers curetted, the pain and infection rapidly disappear.

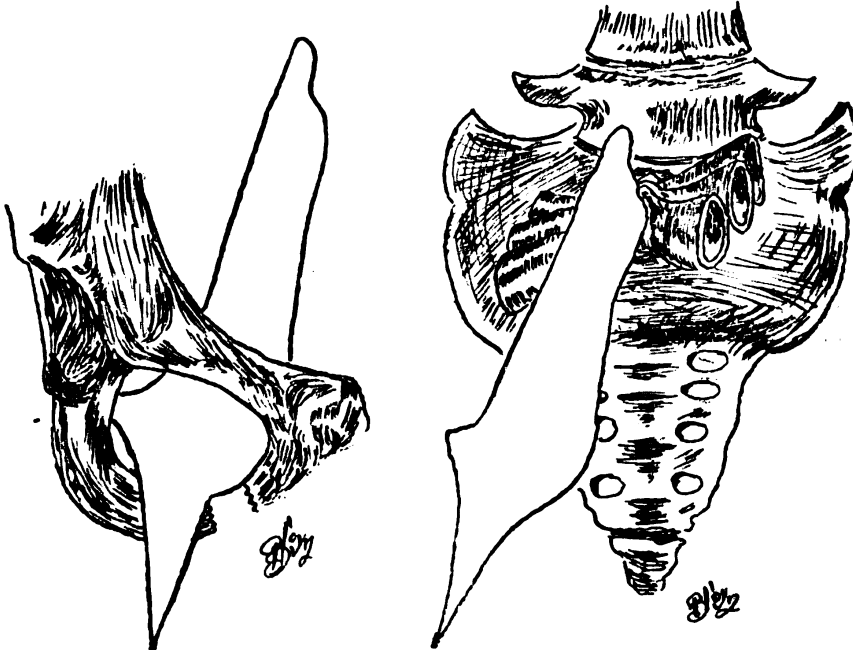
The following formula has been used with great success:

R	Wine of ipecac.....	gm--	15
	Glycerine.....	gm--	4
	Fowler's solution, q. s. ad.....	gm--	30
M. and Sig.: External use three times daily.			

PENETRATING WOUND OF THE PELVIS.

By F. P. GARDNER, Lieutenant, Medical Corps, United States Navy.¹

X——— X———, seaman, second class, United States Navy, was attempting to explore a cave in a cliff about 6 miles from town.



Shows fracture produced by knurl forced into foramen.

Showing how three portions of the intestine were compressed against sacrum.

During this climb he fell about 75 feet, landing in an upright position in an old tree top. A large piece of wood, about 10 inches long and 2 inches in diameter, entered the perineum to the right of the midline, passing through the muscles, fracturing the ischium, and entering the pelvis. The parietal peritoneum was lacerated along the right side of the spine and the ilium was lacerated in three places. He also suffered a simple fracture of the right tibia.

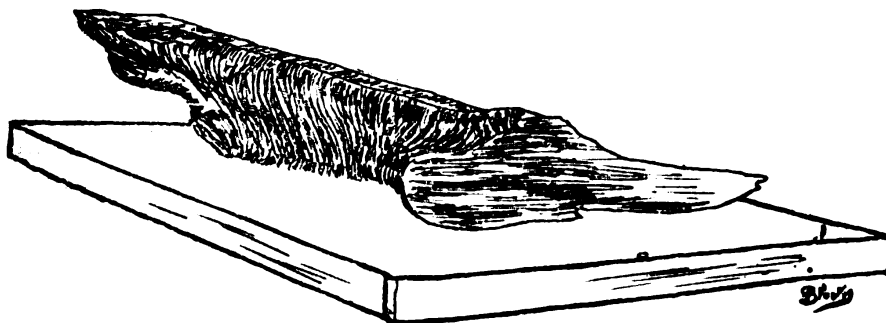
The stick remained in the wound until he arrived at the hospital, whither he was carried by the companions with him on the trip.

¹ U. S. Naval Hospital, St. Thomas, V. I.

This journey took about three hours. Upon arrival at the hospital the patient was taken to the operating room and the stick removed with great difficulty under ether.

The intestines were examined and three lacerations found which were too severe for simple repair. Due to this fact an end-to-end anastomosis was performed from the lowest laceration to the second, about 8 inches above, the intervening portion of gut being resected. The upper laceration, about 2 feet from the second, was anastomosed by means of a Murphy button.

Further investigation showed the pelvic floor entirely destroyed and the parietal peritoneum lacerated and torn from the abdominal wall. This was sutured and drains were put in through the abdomen and perineum.



Knurl which twisted and caught behind pubes. Portion to the left entered the obturator foramen.

The abdomen was closed as soon as possible, but the patient died from shock during the closing of the abdomen.

TRAUMATIC RUPTURE OF SPLEEN—REMOVAL.

By F. H. BOWMAN, Lieutenant Commander, Medical Corps, United States Navy, and E. M. FOOTE, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

S——, machinist's mate, first class, age 30 years, of previous good health, was carried up by an Italian kite. When about 30 feet off the ground he dropped and fell to a sandy beach, striking on the left side and hip. He arose, brushed the sand from his face, but felt very weak and fell down again. The other men picked him up and carried him to shelter. He did not lose consciousness.

After two or three hours he began to vomit, and did so repeatedly, expelling food at first, then bile, but no blood. He was taken to the sickbay, and the following day brought to the United States Naval Hospital, New York, where he was admitted September 22, 1918, at 1.15 p. m., in a condition of marked shock. T. 97.2°, R. 28, P. 112.

The abdomen was dull, especially in the left flank, but there was no distension. The dullness on the left side became less noticeable when the patient was turned to the right. No bones were broken; there was no paralysis; the patient had little pain and was entirely conscious. After taking a little water he vomited watery fluid stained with bile. He passed normal urine.

The patient was given two doses of pituitrin, $\frac{1}{2}$ c. c. each, and $\frac{1}{4}$ grain of morphine, all by hypodermic, and at 5.30 p. m. he was taken to the operating room.

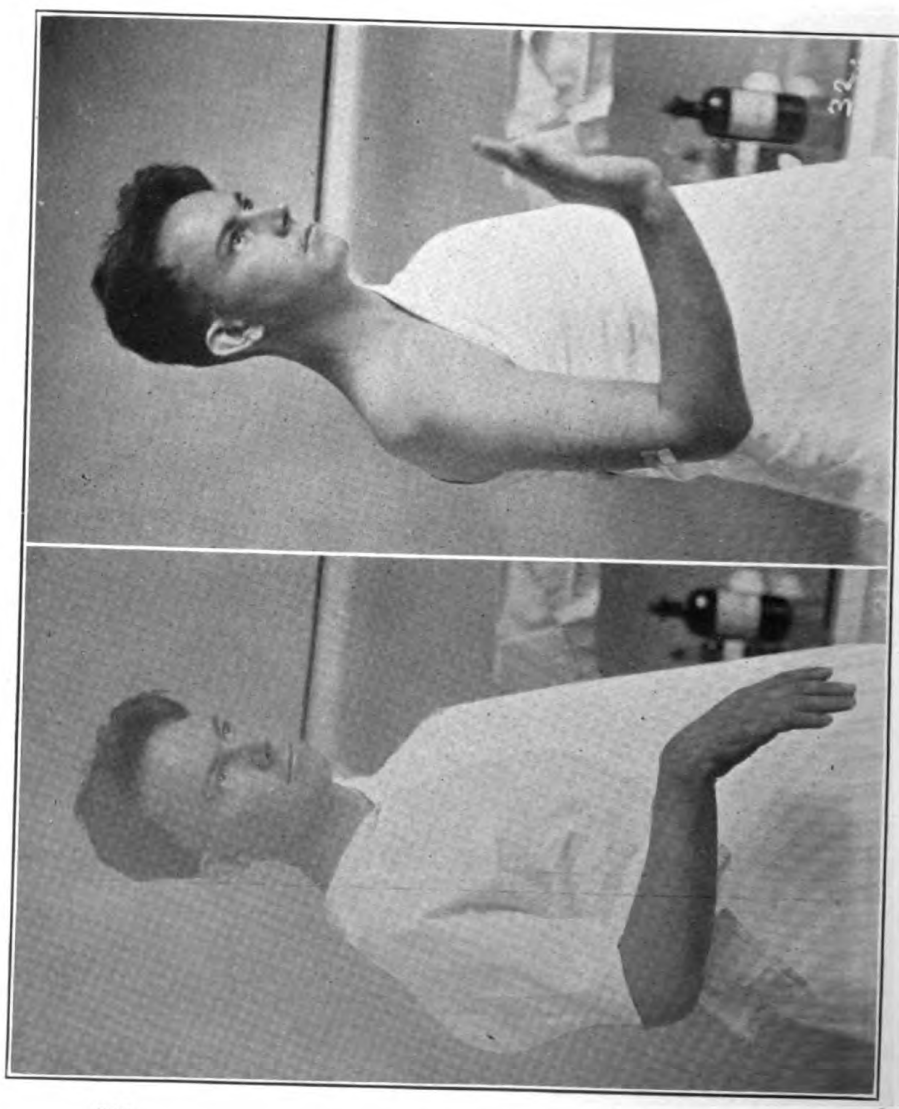
The diagnosis made was abdominal injury with free fluid, probably blood, in the abdominal cavity. The character of the vomited material excluded rupture of the stomach, certainly complete rupture. The passage of normal urine ruled out injury of the kidneys and bladder. There was wanting the distension and tenderness which ought to be present 24 hours after rupture of the intestine. There remained as a probable diagnosis rupture of a solid organ (liver, pancreas, or spleen) or rupture of a large blood vessel.

After a light ether inhalation, a 5-inch vertical incision was made to the left of the umbilicus. At the first nick of the peritoneum, dark fluid blood poured out. By manipulation of the intestines more than a quart was obtained. The visible intestines were not ruptured, and there were no adhesions. The left upper quadrant of the abdomen was full of blood clots, and the badly ruptured spleen was easily recognized by the palpating hand. A 4-inch transverse incision was made from the upper end of the vertical one. The spleen was delivered and examined. Hemorrhage had ceased, but the numerous fissures of the organ made its removal necessary. The lower half of the organ was almost separated from the rest, and there were other tears extending nearly to the upper end. Both clots and free blood were dark, and apparently free hemorrhage had ceased some hours before. There was no apparent injury of liver or pancreas.

The pedicle of the spleen was ligated with plain catgut and the organ removed. The abdomen was closed in layers without drainage. Chromic catgut was used for the deep fascia; elsewhere plain catgut.

The patient was almost pulseless when returned to bed, but soon recovered consciousness. He was given fluids and stimulation by rectum. Pulse ran from 140 to 150 during that night.

Recovery was satisfactory, though the patient regained his strength very slowly, possibly on account of the great loss of blood. On the day after operation he passed 1,100 c. c. of urine. The highest temperature was 102° on the fifth day. He vomited only once after the operation. The wound healed by first intention, except for a small slough beneath the skin at the lower angle of the wound.



1. Wrist drop.

2. Result of treatment.

Blood counts taken at various times showed a very gradual replacement of the lost blood cells, as follows:

	Hb. (Sahle).	Reds.	Whites.	Polys.	Small lymph.	Large lymph.	Trans.
Oct. 1, 1918.....	90	4,060,000	15,150	66	27	5	1
Oct. 29, 1918.....	85	3,710,000	9,700	64	30	4	2
Nov. 30, 1918.....	62	3,670,000	8,050	70	25	3	2
Dec. 20, 1918.....	77	3,850,000	7,800	55	33	5	6
Jan. 4, 1919.....	89	4,230,000	8,550	65	26	8	0

The patient gained strength slowly, but after six weeks he was able to be about most of the day, and went on furlough. There were no symptoms referable to the abdomen, nor, except as stated above, of any character.

Patient was surveyed from the service on January 8, 1919, not because of any physical disability at the time, for he was perfectly well, but because of the fact that his physical resistance being lowered by the loss of the spleen, service conditions would be extremely trying on him.

TEMPORARY WRIST DROP, OPERATION AND PROMPT RECOVERY.

By J. I. YOHANNAN, Lieutenant, Medical Corps, United States Navy.

On May 9, 1919, R. H. T., machinist's mate, first class, 22 years old, while throwing a baseball felt his arm "give way." He immediately reported to the sickbay of the U. S. S. *Wadsworth*. Examination showed fracture of right humerus about 2½ inches above elbow. The fracture was reduced and the arm put in plaster cast. There was no X-ray taken at the time, as no facilities were available. Family and venereal history negative.

On May 31 the cast was removed. The arm was stiff and extension painful. Daily extension exercises and massages were instituted.

On June 10 there was marked improvement, though extension was still painful.

On June 18 a skiagram, taken at the New York naval hospital, revealed "old fracture of humerus, inward displacement of upper fragment, and bone regeneration."

On June 23 under pressure, the arm could be extended nearly straight, but the patient could not use it to any extent. At times there was numbness of thumb and index finger and motions of the wrist gradually became limited.

On June 24 the patient was transferred to the United States Naval Hospital, New York, and four days later to the United States Naval

Hospital, Wards Island, for further treatment. Here examination showed fracture of right humerus, slight deformity, shortening of the right arm, limited motion, diminished flexion and extension of the forearm, loss of power of hand and wrist and wrist drop. See figure 1. Roentgenogram revealed "oblique fracture, middle of shaft of right humerus, overriding, and poor position."

The point to be determined was whether the pressure symptoms were due to the plaster, to forcible extension after removal of plaster as the patient claimed, or to a pressure callus.

Tests for nerve and muscle sensibility were made to determine the nature of the injury. As a result it was concluded that the musculo-spiral nerve was paralyzed and the paralysis was due to the inclusion of the nerve in the callus.

On July 16 the patient was operated upon by the chief of the surgical division. The incision was made over the exostosis at the juncture of lower and middle third of the shaft of the humerus and the parts were dissected to expose the musculo-spiral nerve.

After exposure the nerve was found to be adherent to periosteum, the musculo-spiral groove was filled in. Instead of lying in a smooth groove the nerve was riding on a hard ridge and surrounded by a mass of callus. Of course it can readily be seen how this caused the pressure symptoms, i. e., numbing of thumb and index finger and the wrist drop. The exostosis was chiseled off, the nerve was transplanted over a piece of triceps, and the wound closed.

On July 28 the skin sutures were removed, when the flexion of hand on forearm was found to be almost normal. Exercises were instituted, and when the patient left the hospital on August 7 he was practically well, convalescing rapidly. (See fig. 2.)

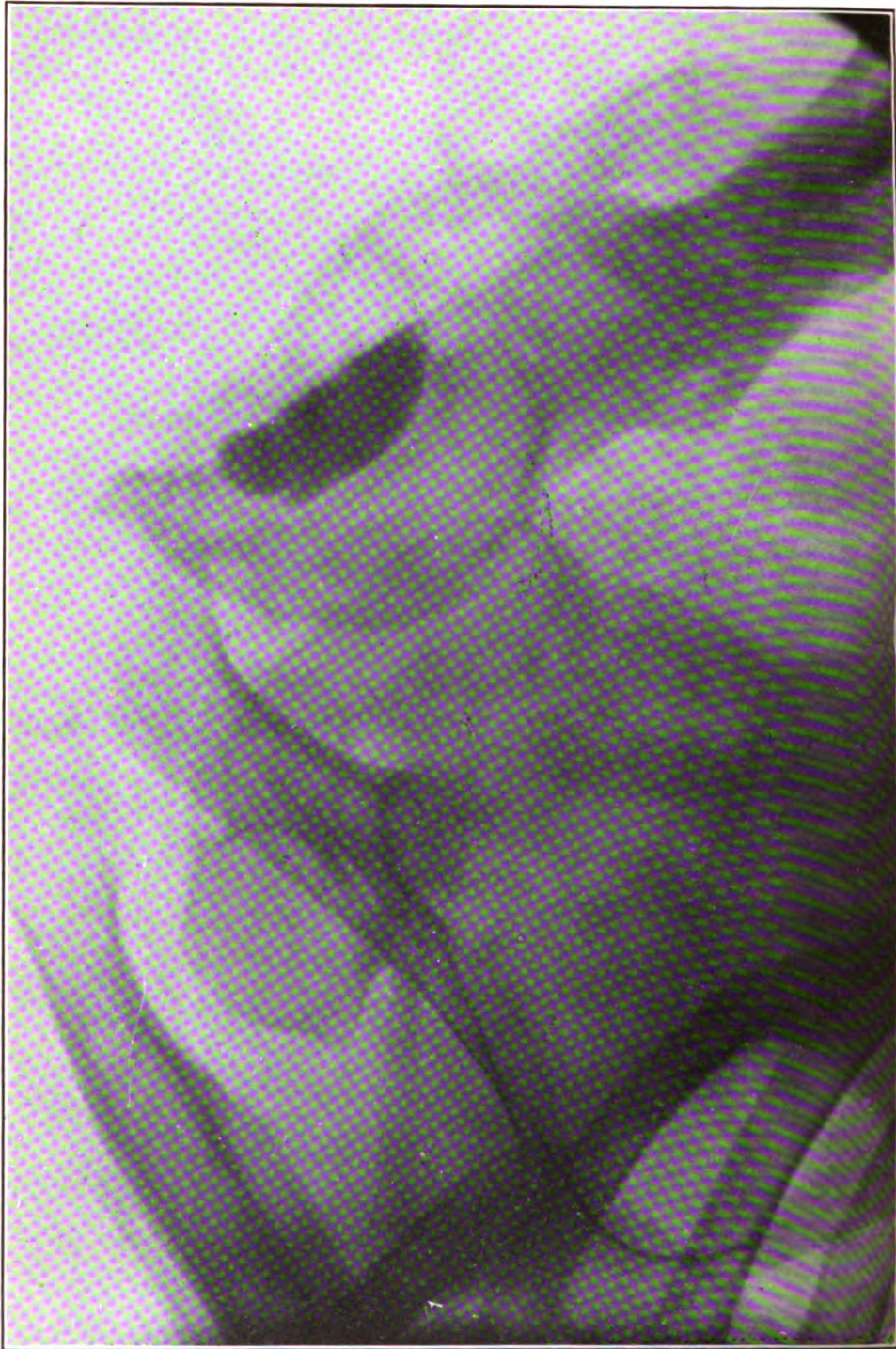
The object in reporting this case is to show that the inclusion of a nerve in a gradually hardening callus will cause its paralysis—in this case a temporary wrist drop—ultimate degeneration of the nerve and permanent paralysis of the parts supplied by it.

The lesson to be derived is: Operate before degeneration sets in. Free the nerve from the clutches of the callus, and remove the superfluous callus. This done, the recovery is usually very rapid.

A PLASTIC OPERATION ON THE MUSCLES OF THE SHOULDER.

By R. W. AUERBACH, Lieutenant, Medical Corps, United States Navy.

L—— R——, Pvt., U. S. M. C., 25 years old, while in action against the enemy at Belleau Wood on the morning of June 23, 1918, received a bullet (lead) wound of the right shoulder, the missile entering anterior to the head of the humerus, making its exit posteriorly



Old osteomyelitis of upper third of humerus with a foreign substance (probably bismuth) filling the space of the greater tubercle and intertubercular sulcus.

549

12 cm. below the point of entrance, and tearing away muscle and bone in its passage. He walked to the first-aid station, where anti-tetanus serum was administered, and emergency treatment given; he was then taken to the field dressing station, and the following day to Hospital No. 7 at Forté, where he was operated on; the wound was cleansed, a gauze drain inserted, and a traction splint applied. Five days later he was transferred to the base hospital at Vichy, where Carrel-Dakin treatment and later dichloramine-T treatment were instituted, and continued until August 20, 1918, when he was received on board the U. S. S. *Mongolia* for transportation home, and finally admitted to the United States Naval Hospital, New York, for treatment, September 2, 1918.

Here an X-ray of the right arm showed chronic osteomyelitis in the upper third of the humerus. On September 15 a portion of the humerus in its upper third was removed and the wound drained. Five days later atrophy of the remaining portion of the deltoid muscle was noted. Convalescence progressed over a period of four months until the wound was entirely healed. A board of survey then recommended that he be sent to the reconstruction hospital at Colonia, N. J., where, from January 15, 1919, until May 28, 1919, the patient was treated by mechanical and electrical therapeusis. He was then readmitted to the United States Naval Hospital, New York, N. Y., and after a period of four days was transferred to the United States Naval Hospital, Wards Island, N. Y.

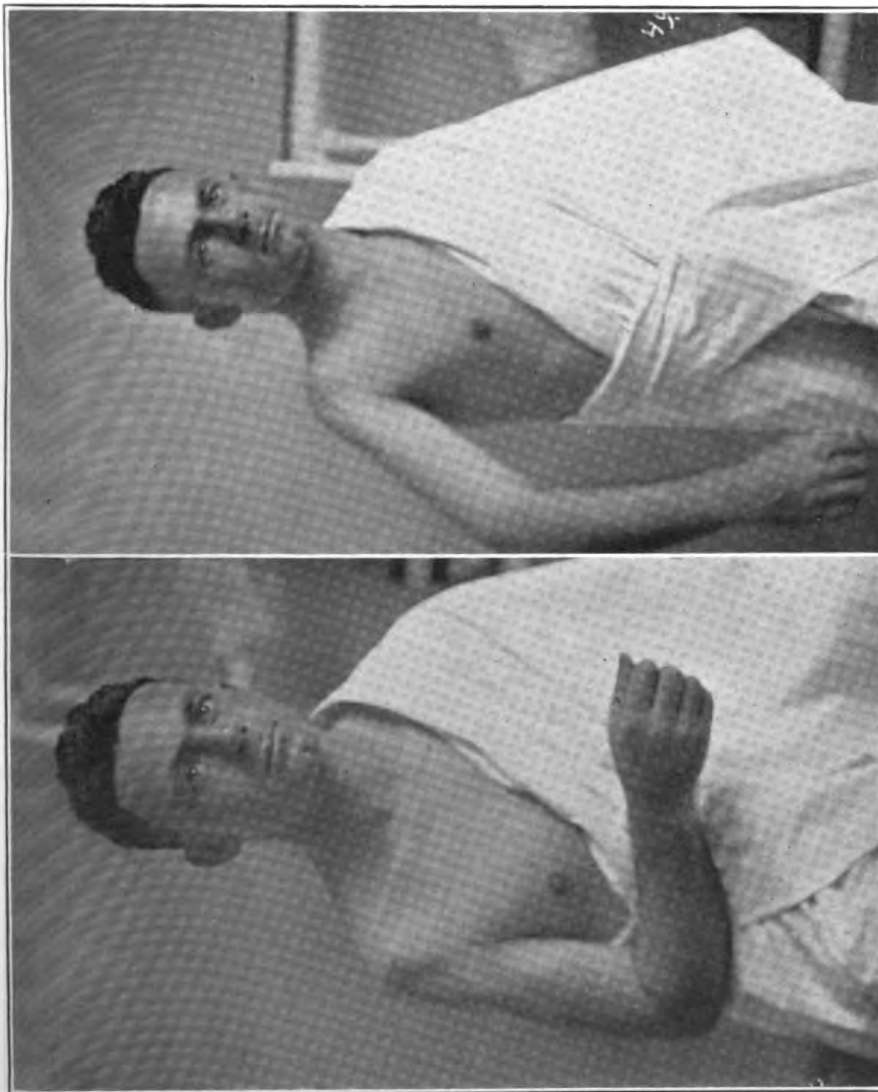
At this time he was examined by the chief surgeon and the following condition of the right arm noted: Scar 12.5 cm. long from the region over the coracoid process extending downward along the course of the deltoid muscle; contour of the shoulder destroyed and a depression over the region of the tuberosities of the humerus; the region over the right deltoid less prominent than over the left; the arm limp against the body; a palpable depression over the head of the humerus, with an immobile scar adherent to the bone; right deltoid muscle considerably atrophied, measuring 25 cm. in circumference in contrast with the left, which measured 30 cm. Of the motions, abduction was nil, forward and backward motion about 10°, adduction across the chest practically nil, medial rotation negligible, lateral rotation nil, flexion of forearm possible only to a position of right angles with the arm. Patient presents himself as in (1).

A roentgenogram of the arm at this time showed (facing) an old osteomyelitis of upper third of humerus with a foreign substance (probably bismuth) filling the space of the greater tubercle. Attempts to increase motion, by mechanical therapy proved futile (facing) and operation was advised.

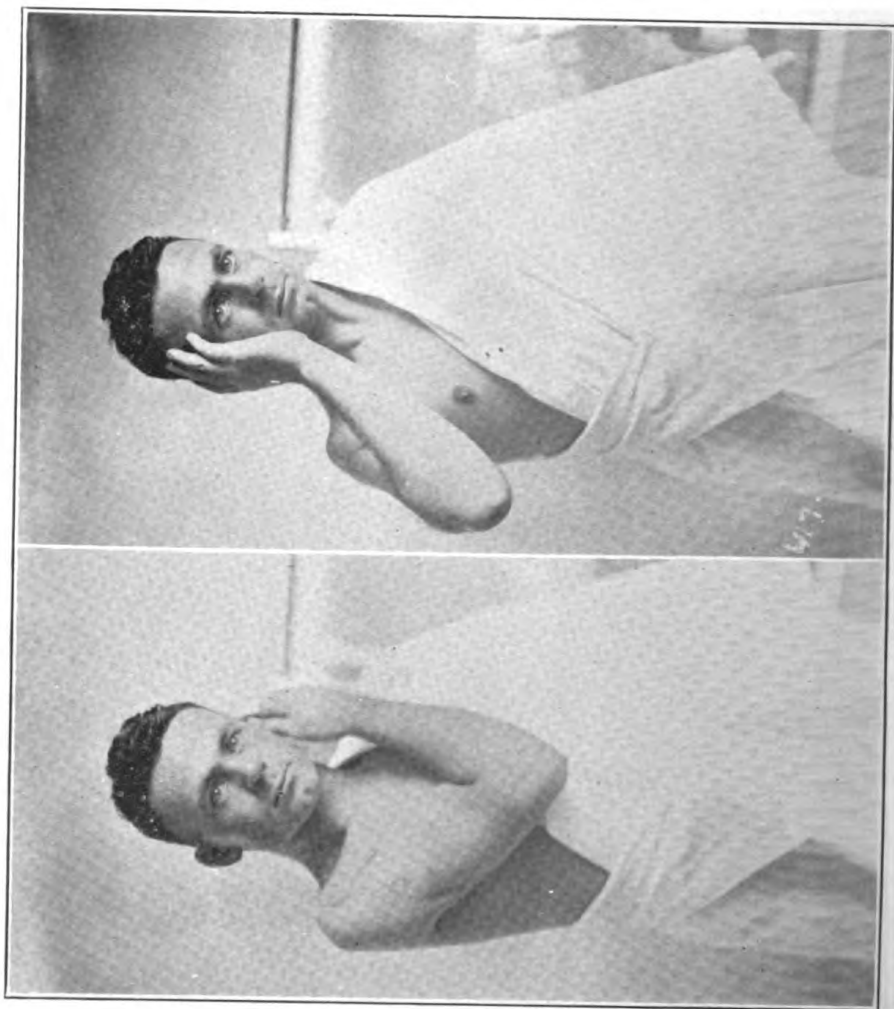
47720—21—4

On July 16, 1919, over one year after the injury, under ether anesthesia, a scar 12.5 by 3.5 cm. was freed from adjacent scarred humerus and removed. The deltoid, supraspinatus, infraspinatus, teres minor, part of the latissimus dorsi, subscapularis, teres major, biceps, and the superior humeral fibers of the pectoralis major were found to have been lacerated, with consequent atrophy, the deltoid suffering most destruction. The greater tuberosity, a portion of the lesser tuberosity, and the upper portion of the lateral ridge of the intertubercular sulcus, together with the intertubercular sulcus and a lesser portion of the medial ridge, had also been destroyed. The lacerated muscles were then freed en masse from the humerus for a distance of 3 cm. on either side, slid each toward its mate and united by means of No. 2 chromic mattress sutures, great care being taken in the suturing of the deltoid segments, which in turn were sutured to the pectoralis major. The wound was then closed without drainage (the scarred bone not having been interfered with, thereby lessening the danger of latent potential infection) and the arm put up in anteroposterior splints. On July 28 the skin sutures were removed and gentle massage was begun, followed by passive motion and ultimately active motion until August 7, 1919, when he was transferred to the U. S. S. *Mercy*, this hospital (Wards Island) being placed out of commission. His condition was as follows: Abduction=about 40°, by the action of the united fibers of the deltoid, clavicular fibers of the pectoralis major, subscapularis and supraspinatus (see illustrations). Abduction across the chest=about 45°, by the action of teres major, teres minor, pectoralis major, and biceps. Lateral rotation=almost normal, by the action of the deltoid, teres minor, and infraspinatus. Medial rotation=almost normal, by the action of the deltoid, pectoralis major, teres major, and latissimus dorsi. Forward motion=about 30°, by the action of the deltoid, biceps, pectoralis major, and subscapularis. Backward motion=about 25°, by the action of the deltoid, infraspinatus, teres major, and latissimus dorsi.

It is of interest to note: (1) The extreme importance of the deltoid and pectoralis major muscles in the various movements of the shoulder joint. (2) The importance of avoiding scar tissue with the possibility of pent-up organisms, thereby lessening liability of infection. We excised the fleshy scar and avoided injury to the bony scar. (3) Although mechanical and electrical therapeusis could avail but little to improve function without the means for functioning, nevertheless it did stimulate circulation and regeneration of injured tissue tending toward the success of a later operation.



1. Before operation: No abduction, limited rotation, forward and backward motion limited to 10° , flexion of forearm 90° , inability to reach the mouth.
 2. After operation: Abduction 40° , medial rotation almost normal.



After operation: Showing forward motion, medial rotation, adduction across chest, abduction, flexion of forearm, and ability to reach the mouth.

A SIMPLE OPERATION FOR TRICHIASIS.

By H. S. CRAGIN, Lieutenant, Medical Corps, United States Naval Reserve Force.

A naval medical officer serving with the Marine Corps in Santo Domingo has many chances to observe unusual cases. Frequently he must depend upon his own ingenuity rather than upon the assistance of consultants and specialists, if the case demands operative interference. My reason for reporting this operation is that I can not find an exactly similar operation described in the textbooks on ophthalmology.

While serving with the 48th Company as post medical officer at La Vega, Dominican Republic, this case came to my attention. One morning I noticed a native girl about 18 years of age being led through the street by a small child. She stated that her eyesight had been failing for two years. She was then unable to distinguish even the figures of persons who passed her on the street, in the brilliant tropical sunlight.

Examination of the eyelids showed the tarsus of both lids of both eyes to be thickened and roughened, apparently by trachomatous infiltration, and covered with velvety conjunctiva tarsi. A thick pannus, whitish yellow in color with perceptible blood vessels, nearly covered the pupils of both eyes. Marked trichiasis of both upper and lower lids was present, the cilia of the upper lids being displaced so that they lay between the upper lid and the eyeball. Entropium cicatriceum of both upper and lower lid, photophobia, and lachrymation were present.

On questioning the girl further I found she was an orphan and that she was waiting until her friends could collect enough money to send her to Santiago to see an eye specialist. On learning that I was willing to operate, she eagerly urged me to do whatever I could to relieve the condition.

The treatment preliminary to operation was as follows: Both eyes were irrigated with warm solution of boric acid. Then 2 drops of 10 per cent cocaine solution were instilled in each eye. When the conjunctiva was completely anesthetized, a crystal of copper sulphate was applied to the inner surface of both lids and to the pannus formation. Boric acid solution was then used freely, followed by argyrol solution 10 per cent, which was instilled three times daily for one week. Two applications of copper sulphate were used in the week.

The feasibility of attempting the Jaesche Arlt, Snellen, Oettinger, or Panas operation was carefully considered. On account of the great hypertrophy of the tarsus and the great distortion of the cilia it was considered that these operations would not be successful.

The following procedure was carried out: The girl was anesthetized with ether. The right eye was thoroughly cleansed with boric solution and argyrol, 10 per cent solution. A Jaeger's horn plate was inserted under the upper lid. With a sharp scalpel, an incision was made parallel to the margin of the lid, but about one-third of an inch from the margin. This incision was carried from inner to outer canthus. The incision penetrated the outer skin and extended through the orbicularis palpebrarum, tarsus, and finally the conjunctiva of the inner portion of the lid. The thin strip thus removed contained all the hair papillæ with cilia attached. There was considerable bleeding from twigs of the arcus tarseus inferioris and the rami perforantes. This was easily controlled by six sutures of 00 catgut, which were inserted in the margin of the lid and maintained the skin and conjunctiva in apposition. The same process was repeated on the lower lid. Then the visible vessels traversing the pannus were incised at right angles to their course, and a small area of conjunctiva was curetted down to the underlying tissue, completely around the pannus area. A week following this operation the same procedure was undertaken on the left eye. The catgut sutures were removed in two days. Daily irrigations of boric acid solution were used for one week following the operation. The eyes were bandaged three days only.

The results were as follows: The patient was able to wash floors, cook, and mind a child, and gain a livelihood. Photophobia and lachrymation were not present. The patient's vision was improved to the extent that she could count fingers held before both eyes. The pannus formation was much decreased and it became whitish in character and apparently much more translucent. The removal of the wide strip from both lids did not prevent complete closure of the lids both voluntarily and while the patient was asleep.

The chief merits of this operation are its simplicity and the impossibility of a return of the condition. The result was perfectly satisfactory to the patient, who was observed one month following the operation. The cosmetic disability caused by the loss of lashes was partly corrected by wearing sun glasses.

REPORT OF A CASE OF ADENO-CARCINOMA.

By M. BOLAND, Lieutenant Commander, Medical Corps, United States Navy.

H. D. G., private, Company I, 112 Infantry, age 25 years. About 3 p. m., April 21, 1919, this patient was found by a naval hospital corpsman lying on deck in the after mess compartment of the U. S. Navy transport *Pocahontas* in a semiconscious condition and brought to the sickbay. He was cyanotic; pulse weak and thready; respiration

shallow and hurried; chest negative, except heart slightly displaced to left; slight rigidity over gall bladder. There was a tumor mass in lower epigastrium. Right testicle missing. Both feet and legs anesthetic. Placed in bed; vomited some digested blood and passed several tarry stools. Perforated gastric ulcer and malignant tumor of pylorus considered. Symptomatic treatment.

It was decided not to operate, this decision being concurred in by the regimental medical officer and a casual Army medical officer, (lieutenant colonel) whose practice for 10 years had been limited to general surgery.

April 22. Condition somewhat improved. Patient stated that he had been well until January, 1919, when he was operated on for undescended right testicle. Questioning elicited the fact that his right testicle was enlarged, firm and painful when removed in January. This confirmed our opinion of malignant growth. Family history negative. Patient had been feeling badly for some days prior to embarkation, but did not go on sick report for fear he would not be sent home with his organization. Nor did he report at sick call after embarkation.

April 24. Condition unchanged. Tumor mass in lower epigastrium stationary in size; no further vomiting or bloody stools. Still consider operative interference inadvisable, though regimental medical officer favors it.

Condition remained very satisfactory until April 26, when he commenced to sink rapidly and died at 5.15 p. m.

Autopsy at 8 p. m.: Heart and lungs normal. Sixty mls of fluid in pericardium. Stomach, spleen, pancreas, and left kidney normal. Right kidney shows beginning hydronephrosis due to occlusion of ureter by tumor mass; mass also adherent to lower end of right kidney. Liver: Numerous tumor masses scattered throughout, some of them degenerating; left lobe much enlarged. Pelvis: Abdominal and mesenteric lymph glands make a solid tumor mass. One large tumor mass 5 by 7 by 10 cm. in front of second to fourth lumbar vertebræ, adherent to and beginning to erode through the wall of the gut about at the junction of duodenum and jejunum. This mass was also adherent to the head of the pancreas. A diagnosis of mixed malignant tumor was made and liver specimens were sent to the United States Naval Medical School Laboratory, Washington, D. C., for examination and report.

Laboratory report No. 1736, dated May 9, is as follows:

Diagnosis: Metastatic carcinoma; adeno-carcinoma. Specimen consists of sections of liver, each containing large gray tumor nodules. These nodules are soft and granular.

Microscopic: Sections show the tumor tissue invading and compressing the liver cells. It is composed of rounded and elongated

alveoli of large vesicular epithelial cells which stain rather lightly. The arrangement is distinctly glandular and suggests the intestinal tract as the origin. In places there is extensive mucoid degeneration and extravasation of blood.

This case is considered of interest on account of its occurrence in a man 25 years of age.

Autopsy confirmed the wisdom of nonoperative interference. Operation would undoubtedly have hastened death. Remains were embalmed and forwarded to next of kin.

CHANCROIDAL INFECTIONS.

By W. F. PEARCE, Lieutenant, Medical Corps, United States Navy.

Chancroidal infections are, at times, very resistant to treatment and it is thought that the following methods of treating them employed in the hospital might be of interest.

The infections treated have been chancroids of various types and chancroid infection of lymph-node. The latter were treated in accordance with well-established surgical principles, namely, incision and free drainage where the glands were completely broken down and a considerable amount of pus was present, or, in lieu of this, the dissection of the glands and their removal in toto.

Two fairly well defined types of chancroid have been observed: (1) A superficial type with a marked tendency to increase of surface area involved, "the creeping type," and (2) the deep type in which the surface area involved is not large but in which there is a pronounced tendency to involve the deeper tissues. Apropos of the latter, one case was observed in which the surface opening was pin point in size with discharge of a purulent material. Upon passing a probe into this opening a cavity was located, and when the opening was enlarged by incision, the cavity was seen to be about the size of a pea or slightly larger, and with the general characteristics of a chancroid-irregular base and walls with discharge. It was on the glands near the frenum and leading from it was a burrow extending under the frenum.

The writer has seen many cases of severe chancroidal infections following bilateral slit of the prepuce. These cases were usually good examples of the superficial type of chancroid, but were very large in area, usually involving the entire flap edges, and were accompanied by extensive edema and inflammation of the flaps. These cases improved very rapidly under careful and thorough treatment. In this connection the writer has noticed that many of the dorsal or lateral slits are made so long that in a later circumcision the mucous membrane has been encroached upon to such an extent that an in-

sufficient amount remains for suture to the skin. It is believed that in most cases these slits are unnecessary if sufficient patience is exercised in the use of prolonged frequent immersions in hot boric or hot magnesium sulphate solutions. When these fail and it becomes necessary to perform the slit, care should be used that it be not extended too far and the incision edges should be cauterized with nitric acid, the actual cautery, or other similar agent.

In the treatment of our cases a factor of predominant importance and one that the writer believes to be essential if good results are to be obtained, was cleanliness of and careful attention to the parts involved. All cases were seen at least once each day by the medical officer and many times during the day by the hospital corpsman in charge.

Two methods of treatment were employed, the method first to be described being used in the larger number of cases, the second method being employed but recently. Their description follows:

THE TINCTURE OF MYRRH METHOD.

The penis is carefully cleansed with soap and water. It is then dressed with tincture of myrrh in a strength of one part of the myrrh to eight parts of water. If the lesion is on the corona a small piece of cotton well saturated with the solution is placed in the corona so that it comes into intimate contact with the lesion.

In the small deep lesions a wick of cotton saturated in the solution is packed into the lesion. The penis is then covered with a gauze dressing saturated in the solution. Parchment paper or other impermeable material is then placed over the gauze and the dressings covered with a roller bandage. After the dressing is completed the gauze and cotton are kept constantly moist with the solution. These patients are usually so anxious to have the lesion heal that they need no urging to come to the dressing room frequently for renewal of the solution.

As a preliminary to the above treatment, and sometimes in addition to it, in those cases in which the edema and inflammation are prominent features the penis is immersed for periods of 30 minutes in hot magnesium-sulphate solution or hot boric-acid solution at frequent intervals.

THE SUN METHOD.

Three times daily the penis, especially the part involved, was cleansed carefully with green soap and water, each cleansing being followed by thorough drying.

In the intervals between these cleansings the penis is exposed to the sun's rays, care being used to not continue the exposure to the

point where it causes a dermatitis. The only dressing used when treatment is not being used is a covering of gauze.

The results under both forms of treatment were uninterrupted improvement, but the improvement under the "sun" treatment was astonishingly rapid, especially in the superficial type of chancroids.

In conclusion, the writer believes that the most important factor in the treatment of chancroids is cleanliness, and that where possible to employ it the treatment by exposure to the sun's rays is an extremely efficient method of treatment. He believes that it is not often necessary to perform dorsal or lateral slits of the prepuce, and that in the few cases where it is necessary it should be correctly performed. Where impossible to employ the sun treatment, the treatment with tincture of myrrh solution is of great value.

A CASE OF SYPHILIS INNOCENTLY ACQUIRED WITH THE PRIMARY LESION ON THE PALM OF LEFT HAND.

By J. W. JONES, Lieutenant, Medical Corps, United States Navy.

Extragenital chancres are not uncommon, the usual percentage being about 10 per cent, of which 3 per cent occur on the lips and 7 per cent elsewhere on the body. The following case shows a very interesting mode of infection, and an uncommon site for the primary lesion:

C., chief pharmacist's mate, United States Navy. Family history, negative. Previous history, negative except for the fact that the patient says he had a lesion on the penis in May, 1918. This was diagnosed herpes. Repeated Wassermann reactions for five months showed negative reaction.

Present condition: Patient was assigned to duty in the venereal ward in base hospital No. 5, Brest, France. On March 9, 1919, he made a number of smears on glass slides from cases of chancroids and chancres. After examination the patient was cleaning the glass slides when one broke and penetrated the palm of left hand. The wound was cauterized with phenol. Three days later the wound, although practically healed, began to feel tender. A lesion the size of a white bean developed, which the patient says was indurated. This lesion was trimmed with a safety razor blade and again cauterized, this time with silver nitrate.

The lesion began to heal slowly, disappearing entirely in about two weeks. About April 15, 1919, the patient noticed a small macular rash on the chest. A Wassermann test of the blood at this time was reported positive. Following an injection of gaviol the rash spread over the entire body, disappearing the second day. Since then the

patient has been receiving antisyphilitic treatment, and no physical signs of syphilis have appeared. Two blood Wassermann tests taken since show 4+. Aside from general adenopathy and the scar in the palm of hand no physical signs of syphilis have appeared.

A CASE OF CARCINOMA OF THE TESTICLE.

By W. J. CORCORAN, Lieutenant, Medical Corps, United States Navy.

A fireman, V. M., age 27, came to the United States Naval Hospital, Wards Island, N. Y., the latter part of May, 1919, with a diagnosis of orchitis, chronic (nonvenereal). His health record shows no previous entry. The family and personal histories are negative. The patient denies any venereal disease and his Wassermann reaction was negative.

The present illness dates from March, 1918, when the patient fell against the edge of a coal bucket, sustaining a severe blow on the left testicle. During the following week the testicle became enlarged to a size approximating three times the normal and was very hard and painful. Under the action of local analgesics the pain gradually subsided, and at the end of three weeks the patient experienced only occasional dull aches. Months passed and there was no change in the size or hardness of the organ, for, as the patient relates, "it stayed the size of a pear and was as hard as board." He also states that the surface of the testicle was irregular. In February, 1919, following a long coaling watch, the testicle became once more quite painful, but the pain lasted only a short time. He was sent at this time to a naval hospital for treatment, and while there the patient's testicle was still very large, hard, and irregular, and there were constitutional symptoms of a gradual decline of the patient's general health. He had lost considerable weight and had become during the previous months progressively anemic.

When other measures failed to improve the patient's condition his left testicle was removed and section sent to several laboratories for examination. It was at this time that the patient came to the United States Naval Hospital, Wards Island. The laboratory diagnosis of carcinoma was received at this hospital shortly after the patient was admitted. He was then complaining of pain along the course of the left cord, in the lumbar region and pelvis.

The patient was advised of his condition and immediate operation recommended. The operative procedure consisted of cutting down on the cord at the external inguinal ring, and enlarging the incision sufficiently to follow, extraperitoneally, the vas deferens to the base of the bladder. The vas deferens with the neighboring connective

tissue and lymphatic structures were entirely removed to the base of the bladder. Extirpated lymph-nodes showed carcinomatous metastasis.

Convalescence up to date has been uneventful, but the ultimate prognosis is questionable, since metastasis was found to have occurred along the vas deferens and may have involved the lymphatics at the base of the renal vessels postperitoneally or elsewhere in the body.

REMOVAL OF AN UNUSUALLY LARGE ABDOMINAL TUMOR.

By E. L. JONES, Commander, Medical Corps, United States Navy.

Mrs. L., age 65, mother of the wife of a chief pharmacist's mate, U. S. N., arrived in Guam with her daughter from the United States, via Army transport, May 6, 1919. Admitted to hospital May 11, 1919.

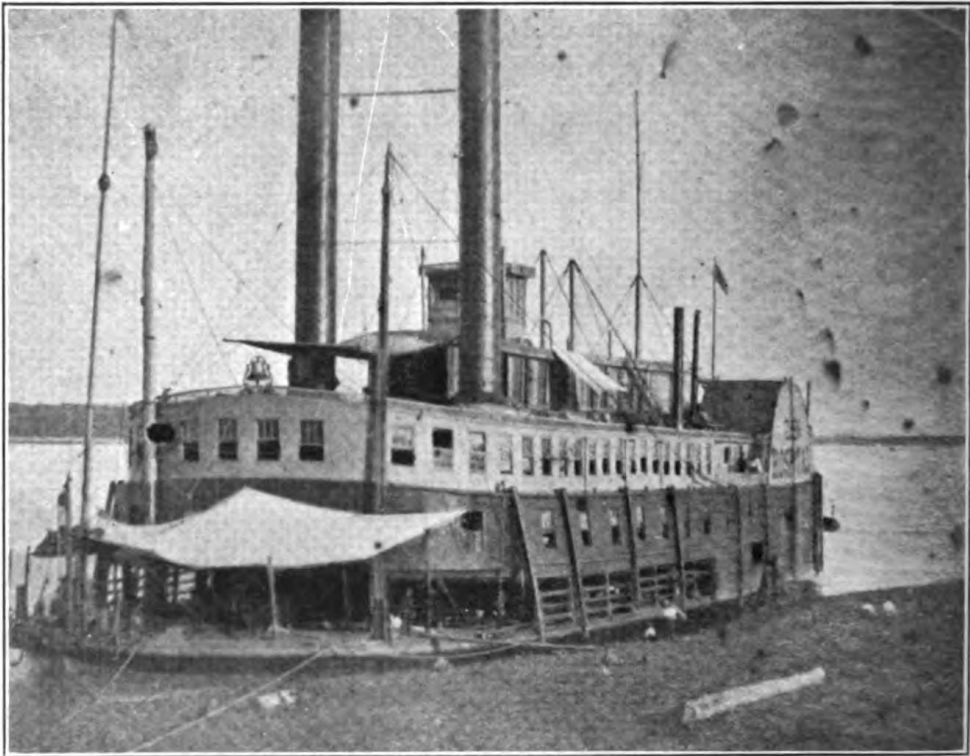
History: Patient is the mother of five children, four living. She states that she has had a tumor for the past 20 years. Recently it has increased in size. Discomfort is occasioned by the weight and the mental anxiety induced. Menses ceased about 20 years ago. General health not impaired.

Examination showed the abdomen protuberant and containing a large quantity of fluid extending from the symphysis to the ensiform cartilage. Urine negative. Vaginal examination seemed to indicate that the tumor arose from the left ovary.

May 13, 1919. Operation. Ether. Median incision from umbilicus to pubes. Incised sac and evacuated 2 or 3 gallons of dark-colored fluid. The sac was firmly adherent to almost the entire anterior abdominal wall, but not otherwise. This was peeled off by means of a piece of gauze. After freeing the sac of adhesions it was delivered outside the abdominal cavity. It was found attached to the right broad ligament by a pedicle about $2\frac{1}{2}$ inches wide. Large blood vessels came off with the pedicle and spread out over the sac. The pedicle was ligated in sections with heavy chromicized catgut and amputated. The omentum was found pushed up out of harms way. It was brought down and spread out over the intestines. The incision was closed by anatomical layers without drainage, using chromic catgut for the first two layers. Patient stood the operation without shock and reacted satisfactorily from the anesthetic.

Convalescence was uneventful. Temperature and pulse normal after the third day; stitches removed on the eighth day, healing by first intention. On the tenth day patient had her sixty-fifth birthday and was allowed to sit up in bed. Discharged to her home on the fifteenth day after operation. Is wearing a snugly fitting abdominal binder.

Comment: The unusual size of the tumor (sac with its contents weighed 31 pounds) and the happy results of the operation are my reasons for reporting this case. The patient had gone along for years putting off the operation; had been told she had a cancer. All evidence of the right ovary had disappeared, only the wide pedicle, evidently the broad ligament, and the large sac remained. The left ovary was fibrosed and about the size of the kernel of an almond.



Navy Hospital Ship "Red Rover" of Civil War period. From a photograph taken by Dr. Bixby, April 22, 1864.

561

HISTORICAL.

A RETROSPECT OF NAVAL AND MILITARY MEDICINE.

By J. S. TAYLOR, Captain, Medical Corps, United States Navy.

(It is impossible to give all the sources from which the facts set forth in this article are derived. Of course the splendid "History of Medicine," by F. H. Garrison, and the "History of Medicine," by Baas, were turned to first. Obligations are also due to "Early History of Surgery in Great Britain," by G. Parker; "Military Sanitation in the 16th, 17th, and 18th Centuries," by Col. C. L. Helzmann, U. S. Army (ret.); "Medical Department, U. S. Army, in the Civil War," by Capt. L. C. Duncan, Medical Corps, U. S. Army; "The History of Medicine in the United States," by F. R. Packard; "The Medical Department of the United States Army During the Period of the Revolution," by Col. W. A. Owen, U. S. Army; "The War with Germany," by Col. L. P. Ayres, General Staff, U. S. Army; "Sea Life in Nelson's Time," by J. Masfield; numerous unsigned articles in the British Journal of Surgery, historical papers in the Journal Royal Naval Medical Service and the British Medical Journal, and the works of Lind, Trotter, and Blane.

Some repetition of details given in previous historical papers in the United States Naval Medical Bulletin has been necessary in order to present the subject more fully. As it stands the sketch represents the labors of countless original investigators, among whom the writer can claim no place.)

WHAT IS MEANT BY MILITARY AND NAVAL MEDICINE.

Medicines for soldiers and sailors are not different from those prescribed for civilians, except that they must usually be gotten down without elegant vehicles to conceal the disagreeable taste. The art of medical practice, too, is the same except that its range is greater, including tropical diseases, many maladies unusual in those who stay at home, and all the incidents of bivouac and battle under restrictions imposed by the nature or extent of the campaign and its terrain or the size, structure, and mission of a ship. There are certain types of injury rare in civil life, but common in campaigns which make for a specialized surgery. These and other modifying circumstances make necessary a definite organization in military and naval practice, and this is their distinctive feature.

It was not until permanent standing armies were created and ships of war were kept in commission in times of peace that military medicine became a specialty. An ever-increasing humanity which forbids the murder of prisoners and the abandonment of the wounded has

avored the development of an elaborate medical department with provisions for sick and wounded, both in the field and at the base.

Leaders who possessed real genius for war have always appreciated the importance of husbanding their forces by avoiding needless slaughter, keeping down the number of stragglers, and promoting the recovery of sick and wounded so that they might get back into the fighting line. Every farsighted commander knows how much depends on feeding, clothing, and housing his troops for the maintenance of their physique and morale, but in the remote past, and indeed almost up to the present time, hygiene and sanitation were so defective and surgery was so primitive that there was little economy in man power, and but a limited attempt to salvage the personnel wrecked by war. Even in our own time, in spite of innumerable resources at their disposal, military and naval commanders through blind adherence to what they call military necessity constantly transgress the most elementary laws of health and physical efficiency.

Gen. George Monk, Duke of Albemarle, who effected the restoration of the Stuarts after the Protectorate, was now a general of land forces, now a naval commander. This readiness to serve in capacities so essentially different was a universal characteristic of the protagonists in public affairs from the days of Alcibiades, 400 years before Christ, almost to our own day.¹ Now technical training differentiates all types of military and naval service and specialization is the outcome of experience. The purpose of this paper is not to string together dates and incidents, but to emphasize once more to those who can read history with a philosophic mind that specialization is essential in medical service. To amalgamate branches of work radically different in themselves is to reduce efficiency of function. The line increasingly perfects itself by specialization. There are schools for Naval officers and separate schools for Army officers, and separate war colleges for the two services. This specialization is equally important for the staff. From time to time the undoubted superiority of the civilian practitioner in many a specialty blinds people to the essential requirements of medical service in Army and Navy. From time to time it is suggested by well-meaning but short-sighted officials that civilians hired for brief periods—the duration of an emergency, a cruise, etc.—and the employment of civilian hospitals could satisfactorily relieve them of the annoyances incident to those necessary evils, the staff corps. History, on the other hand, would seem to suggest that the service of individual to individual (whether illustrated by personal attendants on kings, princes, and

¹ Admiral Dewey once had occasion to remind the military forces occupying Manila that he was in sole command on the water.

commanders, or by operations of marvelous dexterity on one or a hundred patients) is not comparable in value to that distribution of service which the medical officer trained to military life can furnish for regiments and armies, or ships and fleets, by the propagation of sanitary principles and the studied employment of system and organization. From levies and hired ships the nations of power progressed to standing armies and permanent fleets and permanent, increasingly efficient, provision for health and happiness of personnel. The medical service to troops and ships should be furnished by those willing to devote a lifetime to military and naval requirements and fully appreciating that mastery of the soldier's and sailor's health requirements in peace and in war constitutes a special profession in itself, a profession affording full scope for the greatest abilities, the most diversified talents and the loftiest patriotism.

When a surgeon of national reputation arrives by special train or high-powered car, sees the patient for the first time, flashes his knife, and in 20 or 30 minutes departs to have no further connection with the case except in the matter of a bill, the observer of the caliber of an ordinary newspaper reporter forgets or is unaware of some details vital to the life of the patient. There was an original family physician who may have consulted with others to diagnose and treat the case, prepare for operation, and select an operator, assisted by a laboratory and a drug store. One or more nurses before, during, and after the flash of genius did their part. The aftertreatment improperly conducted could easily have negatived the big surgeon's best efforts. Contributory to recovery were also the patient's food, accommodations, and surroundings. His previous life and future expectations also played a part toward the final result. This illustrates roughly the function of the military medical officer. He is friend, adviser, nurse, laboratory and clinical diagnostician, consultant, supervisor of food and clothing, and a material factor in the patient's whole career from enlistment to discharge, from promotion to pension. In value, all these combined obligations, well discharged, offset to his military organization as a whole his possible inferiority to the civilian specialist. Conversely, consider the fate of the imaginary patient condemned to be operated on and then abandoned by some prince of amputators.

THE SPIRIT OF MODERN NATIONAL WARS.

Considered from a social standpoint, the most striking feature of modern wars is that they are waged more and more at the demand of nations instead of through the arbitrary will of kings; that they are fought out of regard for some great principle or to insure

national existence and not to gratify motives of individual ambition or revenge. The nation which is heart and soul behind a military cause will insist that its sons shall not be neglected when they fall and will require the most elaborate provision for their comfort and welfare. Reciprocal sacrifices are then rendered by defender and defended. Those who stay at home work to supply what is needed and compel the Government to equip hospitals, furnish surgeons, and provide liberal pensions. Governments, too, have occasional flashes of intelligence and are coming to regard the whole subject from the standpoint of economy, which means that there must be during peace, long before the approach of war, a systematic provision for expansion and mobilization. This is also the time to determine what will be done after war. Certainly wisdom, prudence, and economy strongly suggest that when hostilities begin, and no later, adequate preparations should be begun for the care of the maimed and crippled.

Unfortunately the enthusiasm which a just war begets dies down very rapidly, and when victory or defeat has brought hostilities to a close the natural reaction from privation, suffering, and sorrow creates an aversion to military affairs and makes advance preparations difficult. Legislative bodies then become parsimonious in voting funds and are more inclined to consider the people's unwillingness to be taxed than to do what the wisdom of experience suggests. This spirit is particularly marked in countries like Great Britain and the United States, which are essentially democratic, and would have been equally so in France and Italy but for those geographical and political handicaps that make military efficiency at all times a necessary condition of their survival.

The accumulation of vast quantities of hospital and surgical stores, the training of medical men and of a nursing staff, the distribution and assignment of men and things necessary to a medical department can not be accomplished at the last moment without delay, confusion, and waste; but medical organization has always been secondary to the making and issue of ordnance, accouterments and provisions, for the sick have always received less attention than strategy and tactics in spite of the fact that in all the wars where little value was placed upon human life the military plans for a campaign have been circumscribed or defeated by sickness and wounds. It has always been accepted as an academic proposition, but never acted upon with any degree of cooperation between different military elements, except by the sagacious Japanese in their war with Russia, that more men are disabled in war by sickness than by wounds. This was certainly true up to the time of the Franco-Prussian War of 1870, and it is scarcely an exaggeration to

say that during the great Napoleonic wars it took a man's weight in lead to kill him.

The horrors of the battle of Solferino (1859) as described by Henri Dunant (1862) led to the organization of the Red Cross, just as the frightful situation of English troops in the Crimean War (1854) was responsible for the improvement in military hospitals and military nursing, making them comparable with those of civil life. The names which stand out conspicuously in the medical history of modern wars are Pringle, Larrey, Florence Nightingale, (Pasteur and Lister for their indirect contributions), and Pirogoff. The name of the American Jonathan Letterman certainly deserves a place in this list of pioneers.

MILITARY SURGEONS THE PERSONAL ATTENDANTS OF LEADERS.

But prior to the establishment of permanent standing armies the care of the sick and wounded depended almost wholly on the zeal, enlightenment, and liberality of the individual military chief. Physicians were attached to the persons of commanders in chief, of princes or noblemen, and they ministered to subordinates only when cases of special need were brought to a leader's attention or when that leader desired to confer a mark of special favor upon some man whose wounds were contracted in a peculiarly heroic manner. As we shall see further on, the nations of antiquity did consider the medical needs of the private soldier, though our records on this subject are scant and brief, but even throughout the Middle Ages and for the first century of the Modern Era there was really very little effective organization of medical service in war.

But if there was lack of extensive medical provision for the casualties of war before modern times the matter was not wholly ignored, and considering the circumstances it would seem that in remote antiquity there was fully as much system in the preparations made as was developed at any subsequent period before the sixteenth century.

GREECE, ROME AND BYZANTIUM.

Now that Homer and the Siege of Troy have ceased to be myths we can accept as a fact that physicians were present with Greek troops 1,100 years before Christ; that they extracted arrows and spear heads and bound up wounds; that the value of sulphur as a disinfectant was appreciated; and that there were definite though simple notions of hygiene. Homer contains 200 references to wound treatment, medicine, or physicians.

In the armies of Sparta as far back as the time of Lycurgus the doctor's place was on the flank and his quarters in camp were indicated in such a way as to be easily found by day and by night.

Ctesias, a physician of the school of Cnidos, is principally remembered as a historian of doubtful reliability, but he was present at the battle of Cunaxa (B. C. 401) and healed a wound received in that engagement by Artaxerxes. For 17 years he was the physician in attendance on Persian royalty.

Xenophon in his history of the "Retreat of the Ten Thousand" records the presence of eight surgeons with that body of troops and gives details showing that they were something more than the wound dressers of later times.

The Athenian fleet (B. C. 431-401) had a ship, a trireme, named *Therapeia*. Is it unreasonable to suppose that, if not a full-fledged hospital ship, it was at least a vessel intended to receive the sick and wounded? Such a name would have been very inappropriate for a fighting craft and the Greeks were the last people in the world to ignore the eternal fitness of things.

The word *duplicarius* is used by Ovid, Livy, and other Latin writers to describe a soldier who received double pay or double rations, either for long service or for some conspicuous act of bravery, and this form of reward was used in Roman military service as early as the fourth century before Christ. We do not find this title employed in relation to medical men serving with the land forces, and we may recall here that in the early days of Rome physicians were recruited from the slave class and not much thought of. During the time of the republic, Rome maintained no permanent naval establishment, though often engaged in naval warfare, preferring to get the needed men and ships from allied nations. This continued to be the case until well on into the Imperial Era.

Operative surgery reached a relatively high plane in India and in the Ramayana, an epic poem ascribed to Valmiki (circa 250 B. C.), treatment of wounds is thus alluded to: "The wounded in battle should be quickly picked up, carried into a tent, the bleeding stayed and upon the wounds should be dropped an anodyne oil with the juice of healing herbs."

Under the Roman emperors, beginning with Claudius and more elaborately under Hadrian, some systematic provision was made for the sick and wounded. It became the rule for all permanent army encampments to have infirmaries and hospitals and civilian practitioners served with the troops under temporary appointments, there being no regular medical corps. The army hospital was commanded by the "prefect of the camp," the physicians being under his orders. Special valetudinaria, or convalescent camps, using tentage, were organized whenever five or six legions were operating together. In many localities special bathing establishments were available for soldiers. When men were wounded they were rushed to the camp

in the rear of the battle line and thence, if circumstances permitted, were transferred to the nearest city. Soldiers carried on their person temporary dressings for wounds. Thus it appears that there is nothing very new in the first-aid packet and the evacuation center. There were even stations to which the cavalry could send disabled horses for treatment. It would seem that the army doctor had to fight as well as to treat wounds (as was true of the sons of Aesculapius, who were chiefs as well as doctors in the campaign against Troy) unless we are to translate *militavit* "he was in the campaign" instead of literally "he fought." There are numerous extant inscriptions bearing the word *militavit* after a doctor's name. The physicians of the imperial armies were designated "doctor of a cohort," "doctor of a legion," and their rank and pay was assimilated to that of riding masters, standard bearers, signal men, engineers, architects, and all those who knew enough to teach others or to perform services requiring technical knowledge and skill. All these were classed together as *principales*. It has been claimed by some historians that there were four doctors to a cohort of 420 men. This seems excessive. It is far more likely that a legion of 10 cohorts had a surgeon for each and one additional as surgeon to the legion, like our regimental and brigade surgeons.

It is not until the Empire that we have definite evidence of physicians embarking on ships of war. These naval surgeons are constantly alluded to as *duplicarii*, but they were given double pay, not because held in high esteem—on the contrary naval surgeons were rather looked down on—but because, then as now, doctors are loath to go to sea.

On a monument set up to the Emperor Caracalla (third century) along with the names of 1,013 officers and men are inscribed the names of eight physicians. The museums of Paris, Rome, Dresden, Baden, and Ravenna contain inscriptions relative to the fleets which had their headquarters at Ravenna and Micenum and wherever the name of a physician occurs the words *medicus* and *duplicarius* always follow. The inscriptions also give the name and the type of ship—it was always a trireme that carried a doctor—and the natural inference is that each doctor was engaged for a definite ship or service. Among the names of these triremes we find *Cupid*, *Tiger*, *Faith*, etc. In the fleet at Micenum there was a ship *Aesculapius*, perhaps a hospital ship. We learn from Galen that an eye specialist accompanied a naval expedition to Britain. Trachoma appears to have been extremely common among the Roman soldiery.

The memorial column erected in honor of the Emperor Trajan is decorated by a spiral band of figures carved in relief extending from the bottom to the top of the shaft which shows the incidents

of his various campaigns. A feature of medical interest on this relief is a spirited representation of a group of wounded men being cared for by sick attendants at a dressing station. The famous Code of Justinian mentions examination by medical men to determine the physical fitness for further service of soldiers who had been sick, but it is not stated that the doctors so employed were in military service. (Justinian's own medical attendant was the celebrated Aetius of Amida, who anticipated Graves in "feeding fevers".)

Under the Emperors Mauritius (528 to 602 A. D.) and Leo IV (886 to 912), both of whom wrote on medical subjects, there were in the army of the Eastern Empire "first-aid men," *deputati* or *scribones*, to the number of eight or ten for every division of cavalry (200-400), whose duty it was to rush in and bear away from the thick of battle and then to treat such as fell from their horses or were wounded. The *scribones* were mounted. Part of their duty was to collect the weapons thrown away by the wounded or by fugitives. Later it became customary to pay these rescuers a definite fee for each person attended. They were required to carry with them a container for water because "often the wounded faint."

Paul of Aegina, in his preface to the work *De Re Medica*, reminds the seagoing physician of the importance of taking with him textbooks on the healing art, and points out that as lawyers have need of manuals and compendiums, though they live in cities where books abound, still more is it imperative for ships' physicians in remote places to be furnished with books, since they must often be far away at sea and obliged to give immediate succor, where ignorance or delay may mean death to their patients. In this passage Paul is presumably addressing not only government servants but doctors embarking in merchant ships trading as far as the Indies.¹

THE MIDDLE AGES.

The medical school of Salerno granted licenses to men who restricted their work to specialties like diseases of the eye, rupture, and war wounds. From the history of this school we learn that in Italy physicians were from an early period specially appointed to serve with troops. They were mounted officers and their warrants or commissions stipulated whether they were to have one or two horses. There are records of claims submitted by these military surgeons to recover for horses which were sick or had died. The twelfth-century document is still in existence which records the contract between Ugo of Lucca and the city of Bologna by which that eminent physician bound himself in return for a lump sum of 600 pounds to act

¹ Andrea Corsini, *Annali di Medicina Navale e Coloniale*, Anno xxli, 1916. Vol. II. Fasc. I-II.

as city physician to the poor, to give expert testimony in legal cases and to accompany the troops of Bologna in the field. He did actually participate in an expedition to the Holy Land, was present at the siege of Damietta, and absent from home for three years.

During the period of the Crusades there appears to have been liberal provision for medical and hospital treatment. A great many nursing and benevolent orders sprang up in connection with the needs of the suffering and disabled during the Crusades, such as the Knights of the Cross, the Ladies of St. John, the Sisters of St. Elizabeth, etc. Various orders of knights hospitalers, such as the Hospitalers of St. John of Rhodes, functioned in an auxiliary capacity, somewhat as the Red Cross does to-day, and some of them became organizations of great wealth and political influence. Pope Honorius III took a very active part in the Crusades and did much to improve the condition of sick and wounded. The ship which bore his cardinal legate to the Holy Land carried between decks a complete hospital equipment for a large number of patients. Marin Sanudo in his *Books of the Secrets of the Faithful of the Cross in the Holy Land*, dedicated to Pope John XXII and begun in 1306, says in the recommendations for a projected expedition to Palestine that the personnel should include "three physicians and three surgeons to go aboard the flagship." The first building to be erected ashore was to be a refuge for the sick and infirm supplied with "all things necessary for the health of body and soul."¹

The Saracen armies which the crusaders encountered in the Holy Land also had their physicians and apothecaries. Scattered here and there through the medical literature of the Middle Ages there are references to methods of treatment which the crusaders picked up from the enemy. It was long a custom of the Mohammedan armies when contagious diseases broke out among them to disperse the soldiers in the desert or on the hills until the danger of infection was passed.

As early as the eleventh century there were barbers and barbers' assistants who practiced a rude surgery for the benefit of the sick and wounded aboard ship. A poet of the thirteenth century, one Francis of Barberino (born 1264), in a poem entitled "Dangers of the sea and how in part to avoid them," gives much advice to would-be seafarers, cautioning them against embarking without "priest and barber and a doctor" and "all things needful" for the latter.

From the twelfth to the fourteenth century the Republic of Venice was the great maritime power of Europe, and the government interested itself in the health of those embarked on merchant ships as well as in those who fought their men-of-war. The archives of

¹ A. Cornini, *loc. cit.*

the Republic prove that from 1300 A. D., and perhaps from an earlier date, it had in its service both doctors and surgeons regularly paid by the state, serving on war vessels and in the great annual trading expeditions fitted out by the government. Ships were built, armed and fitted out, and offered at auction to merchant captains who would load them with goods and, after swearing fidelity to the honor of the Republic and St. Mark, they would go out in groups of eight or ten, under orders of a squadron commander, following certain fixed routes of navigation. This squadron formation for merchantmen was necessary for self-defense, as the seas were infested with pirates and many of the available harbors afforded such poor facilities that the ships had to go in stern first while a portion of the crew stood on deck armed with crossbows ready to repel attack. The fleets were named for the routes they followed, and they traded with Tartars and Russians in the Black Sea; with the inhabitants of Asia Minor, Roumania, Greece, Egypt, Tripoli, Tangiers, and Spain, and often went as far as Portugal, France, and the Low Countries.

Each of the galleys on these expeditions had, besides the captain, navigating officers, soldiers, and chaplain, a surgeon or physician. The medical men were regularly paid by the state. If these merchant fleets and their personnel were required for war service the medical men received additional emoluments. The pay was very liberal. It was derived partly from a tax on the pay of the sailors, or else from portions of the pay held back by the employer. In time of peace the pay of the sea surgeon came from the captain of the ship, or the agents, or the state itself. The surgeons of the Republic not only served aboard ship, but also at stations beyond the seas in Venetian possessions such as Zara, Ragusa, etc. In many cases medical officers were able to engage in a little trading for their own profit, but they had to get special authority for this or be fined, as happened twice to Surgeon Gualterius, who omitted this little formality when trading in spices, once on a voyage to Rhodes, once while serving in the squadron of Teofilus. It is recorded that in 1366 a certain Dr. Anthony, of Cremona, was fined for not securing the necessary permission to engage in trade. Surgeon Buonaventura, of Verona, went on a voyage to Trebizond, hoping to profit thereby and because "he did not relish shore duty in Candia."

The Republic frequently allowed salaried naval medical officers to enter the service of some special institution or foreign prince. At least six of them are known to have served as medical advisers to various Kings of Cyprus. Under such circumstances their pay from Venice stopped, but their positions were held open for them against their return. Throughout the fourteenth century, then, the Republic

maintained a regular naval medical service, and the records show that there were constant demands on the part of captains for the state to assign them doctors for their ships. The custom persisted through the fifteenth century. The flagship of an armed merchant squadron carried both chaplain and surgeon. Along with the merchant owners and the young noblemen in search of adventure, the chaplain and surgeon belonged to the captain's mess and sat at his table.

The names of many of these seagoing medical men have come down to us, and the archives of state usually contain some brief reference to their merits and experiences. Peter of Venice was a physician who was "quickly and genuinely prompted by love of country and devotion to his Lord." Zannotto was commended by the captain under whom he served and reputed to have wrought some "beautiful cures." Graciotto, who served in the naval war against the Genoese, was taken prisoner and kept captive a long time in their capital. Albertino, "surpassing master of his art," was killed by the Genoese while serving on board the ship of Thomas Viaro. Giacomo of Forli served in the war against Padua. He was "a man of exceeding courage, who was twice in our forts, and often in danger of life through serious infirmities." Henry of Beldemadis was accorded special honors because he had gone with the Doge's fleet against Chioggia during the war with Genoa and because he had "attended the sailors and their families without charge."

At the beginning of the fourteenth century a certain Gualterius, a naval surgeon, had a remarkable career as a public servant. Such was the confidence reposed in him by the republic that besides his annual salary he had an allowance for quarters, was voted moneys for the purpose of professional necessities, was helped to pay his debts, was granted a considerable sum as dowry to help him marry off one of his nieces, and on one occasion was actually allowed to draw his pay three years in advance! Under authority of a decree dated February 9, 1318, he founded a hospital or home for aged and indigent sailors, which was to be under the direct supervision of the Doge of Venice and entirely independent of church patronage. This was perhaps the first sailors' home ever established. Combined with it was an herb garden for the cultivation of medicinal plants.

While Venice supplies us with the fullest documentary evidence in regard to the employment of naval surgeons, there is good ground for believing that the maritime Republics of Amalfi, Genoa, Pisa, and the States of the Church followed the same practice, and undoubtedly the Italian Republics and free cities had in their employ doctors for military service.¹

¹ The data about Venice are translated from A. Corsini, loc. cit.

One notes, in passing, that Italy, which was so long in the lead in all the arts and sciences, appears to have been ahead of the rest of Europe in providing for the sick and wounded of all classes of soldiers. In the main, however, medical men were attached to the persons of commanders, and their paramount duty was to wait upon them. Julian the Apostate was attended in his Persian campaign by Oribasius. Galen was summoned to the army of Marcus Aurelius, but held himself and his career too great for such work. He preferred Rome and a post near the infamous Commodus to campaigning against the Marcomanni. Marcellus Empiricus was physician to Theodosius I. Throughout each succeeding period for a thousand years we look in vain for details about physicians and surgeons assigned to the men at arms and find only attendants on princes and commanders.

Arnold of Villanova (1235-1312), physician to Peter III of Aragon, wrote on the "Regimen of Camp Followers" and tells how to estimate the purity of drinking water by immersing in it a clean rag, which was next exposed to the sun. If there was any permanent discoloration the water was to be pronounced unfit to drink. As soon as printing came into vogue books on surgery began to appear, the surgery of barbers and their apprentices, and it was usually upon this class of rough and ready, practical, but unlearned men that the common soldier had to rely for assistance. Many of the barber surgeons rose to positions of influence and power and then they became the personal attendants of the mighty. Thus Leonardo Botallo of Asti started as a barber's apprentice, but eventually became surgeon to Charles IX and Henry III of France. Another example was Franco, and more conspicuous still Ambroise Paré, the greatest military surgeon up to recent times. Germany furnished several barber surgeons of merit who had large experience of wound treatment. Heinrich von Pfolspendt, a Bavarian, wrote on this subject in 1460 and mentions gunshot wounds, but a volume published at Strassburg in 1497 by Hieronymus Brunschwig gave the the first detailed description of them. It was illustrated by striking woodcuts. A still fuller presentation of the subject is found in the Field-Book of Wound Surgery by Hans von Gersdorff, another Alsatian, published at Strassburg in 1517. Among the illustrations is the first known representation of an amputation. The superior of them all was Felix Würtz, of Bâle, and he had the merit of addressing his fellow barber-surgeons in their own language instead of Latin. He was a close observer and thinker and advocated much that was sound in his "Practice of Surgery." He condemned sutures, tents, tampons, poultices and salves in wounds and, above all, the too curious probing of them. He was for keeping them clean and protected from the air. The patient was to be fed on

a liberal scale, as one would feed a woman after confinement. His directions for the management of head injuries are simple and sound, and showed his appreciation of the seriousness of intracranial suppuration. After shaving the scalp, the chisel is to be carefully applied through a crucial incision and depressed fragments or spicules of bone to be carefully removed, as well as all chips thrown off by the chisel. In discussing suppuration in the vicinity of the knee he enjoins early manipulation of the joint to prevent ankylosis.

It was while King John was reigning in England that the so-called Laws of Oleron came into vogue. They were a sort of codification of the nautical practice of Europe. In them we note that "if a seaman sustained any hurt through drunkenness or quarreling the master was not bound to provide for his cure but might turn him out of his ship; if, however, the injury occurred in the service of his ship he was to be cured at the cost of the said ship. A sick sailor was to be sent on shore and a lodging, candles, and one of the ship's boys or a nurse provided for him with the same allowance and provisions as he would have received on board." King John, whose reputation was deservedly bad in every other respect, was wise enough to have a full appreciation of the value of sea power. During his reign English ships of war were well supplied with wine, food, and other provisions, and it is recorded that one Alan le Walleis received a pension of sixpence a day for having lost a hand in the naval service.

Up to the reign of Richard III ships required for war service were merchant vessels hired from their owners. Prior to 1350 they were in the nature of galleys propelled by oars, but after that they were galleons propelled by sails. Henry V when preparing to invade France hired the ships he needed from the Dutch and besides this requisitioned all English merchant craft of over twenty tons. There were long delays in embarkation due to an epidemic of diarrhea and the 50,000 troops were so reduced that he only mustered 10,000 men at the Battle of Agincourt (1415). Up to this time Calais was the principal British naval base. Richard III was the first monarch to buy ships outright for the navy but, inasmuch as during peace times he hired them out to traders, they were never immediately available for emergencies. It can be readily appreciated that no very definite system of caring for the sick and wounded or even for regulating the conduct of the well could be developed in a navy of hired ships. Henry VII was the real founder of the British Navy and under him was established at Portsmouth the first dry dock. At his death the navy consisted of 18 government-owned and permanently manned and equipped vessels.

The men's ration was a liberal one. On Sunday, Tuesday, and Thursday each man had $1\frac{3}{4}$ pounds of beef and $\frac{1}{2}$ pound of bacon.

On Monday, Wednesday, and Saturday, 4 herrings and 2 pounds of cheese were issued to each man. On Friday there were issued to every group of four men, half a cod, 10 herrings, 1 pound of butter, and 1 pound of cheese. There was a daily issue of 1 pound of bread per man, and each received an allowance of beer or a mixture of sack 1 part and water 2 parts.

Edward I when he invaded Scotland took with him seven men, surgeons, physicians, and their assistants. One of them was compensated for the loss of three horses killed "in his majesty's service." These men were medical *officers* as they received a knight's pay. There was at least one physician, a Welshman, at Crecy with Edward III.

The Hundred Years War seems to have brought about some attempt at organization of military medical personnel. In 1415 Henry V directed his personal physician, Nicolas Colnet, and his surgeon, Thomas Morstead (or Morestide), to assume charge of the medical features of the campaign. Morstead was to receive about 16 shillings a day and a definite share of the booty, and his chief assistant, William Bredwardine, 8 shillings a day and an interest in the spoils. He was to impress 12 other surgeons to serve under him and see to their being furnished with instruments and dressings. The three archers allowed the surgeons were doubtless to act as a bodyguard and as helpers. There appears to have existed in England even before this time a small association of strictly military surgeons. It was reorganized in 1435 with four masters.

During the campaigns of Isabella of Castile (1484) that enlightened and charitable lady furnished tents for the sick and appointed physicians and surgeons, provided with all necessities, to serve them, and a large number of wagons for use as ambulances. At the siege of Granada (according to the testimony of one of the speakers at a celebration held in Rome over the surrender of Malaga), she provided four huge tents for the sick. "In them everything was so well ordered and the service rendered by physicians and surgeons to the sick and wounded was so perfect that they equalled those of the Ospedal Grande of Milan."

THE INTRODUCTION OF FIREARMS.

Two facts of vast significance in the history of military medicine marked the transition from the Middle Ages to the modern era. Firearms had gradually taken the place of *armes blanches*—the battle-axe, lance, sword, etc. During little more than a generation syphilis had become widespread in both military and civil communities, extending almost with the rapidity of an acute infection, though doubtless this apparently sudden universality was due in great part

to the recognition of a variety of dissimilar manifestations as belonging to a single protean malady. Without going into the controversy about the origin of syphilis, it can at least be affirmed that whereas from the twelfth century on the physicians and surgeons of Europe had used mercury extensively for a great many skin lesions variously known as the big pox, the big variola, the malignant scabies, the mal franoso, böse Blattern, etc., the beginning of the sixteenth century saw them employing mercury for lesions as different as the roseola and the rupial sore, but now considered as part and parcel of one original infection.

WRITERS OF FRANCE, ITALY, AND SPAIN.

The sixteenth century was marked by numerous publications, often of a controversial character, on military surgery. Of these, the most famous were the writings of Ambroise Paré, whose "Method of Treating Wounds" appeared in 1545 and his great treatise on surgery in 1564. Ahead of him, in point of time only, was Giovanni di Vigo, whose "Whole Art of Surgery" or *Practica Copiosa* (1514), in nine books, acquired immediate popularity and was reprinted on an average of once a year up to 1534 and actually reached 52 editions and numerous translations, not for its intrinsic merit, but because Vigo and his publishers had the wit to appreciate the great demand for something definite in black and white on two subjects not yet widely discussed—i. e., the treatment of gunshot wounds and syphilis. It was like our own situation in regard to books on field sanitation or military administration at the time of our participation in the Great War. Vigo, a native of Genoa and physician to Julius II and other members of the della Rovere family, was a man of real ability combined with modesty. He got his friend Anthracius, teacher at Rome and Padua and later the medical attendant of Alexander Borgia, to carefully correct his book, and what is more he admits that the treatment of venereal diseases as set forth by him (consisting mainly of mercurial inunctions) was derived largely from Theodoric and Arnold of Villanova. Vigo was clear and orderly in his arrangement of subjects, but has no favor with the moderns because he took the wrong tack in regard to bullet wounds, holding that they were poisoned by the powder, bruised by the roundness of the bullet, burnt by reason of the fire. From these circumstances sprang the difficulty of cure, and he fell back on the usual cautery or boiling oil, for which he claimed the merit of preventing putrefaction.

Bartolommeo Maggi (1477–1552) taught surgery in Bologna and later as physician to Julius II accompanied that belligerent pope in his campaigns. But the air of Rome disagreed with Maggi and he

had to resign his position and go back to Bologna. In the year of his death his book on the treatment of gunshot wounds appeared in print. Maggi was for the milder methods, discarded the cautery and boiling oil and limited himself to simple cleansing or a protective dressing. Boiling oil, it is to be remembered, was a time-honored remedy for venomous bites. One must infer from his writings that he had done more than one amputation. This was unusual for the times.

Maggi had something of the intensely practical modern spirit, for he conducted experiments with firearms, discharging bullets at bags of gunpowder and shooting off arrows tipped with wax or sulphur. Since the bags did not take fire nor the wax melt he had facts with which to refute some of the statements made by Vigo and others.

Leonardo Botallo of Asti graduated at Pisa and entered the service of Charles IX of France and then of his brother Henry III. He was a most extreme advocate of bleeding, a practice that needed no champion at the time in France, and he wrote a book on it, but maintained that the exact site of this operation was a matter of indifference, provided one selected a large vein. He wrote, too, on gunshot wounds, denying that they were poisoned, and on syphilis. The trephine he used freely. He ranks with Franco and Paré. Like them he was of humble origin, a barber's apprentice at first, but he had an unusual mind. He asserted that the ancients made mistakes just as people did in his time and refused to be dominated by the dicta of Galen, Avicenna, or De Chauliac. In practical surgery he held that the style of manual manipulations (technique) and experience in operating counted for more than long-winded discussion.

Another advocate of simple, natural methods of handling gunshot wounds was Giacomo Berengario da Carpi, the anatomist.

On the other hand Alfonso Ferri of Faenza, physician to Paul III, held to the poison theory of gunshot wounds. But he observed that a ball might remain in the body for 20 years without doing damage. He helped to popularize the use of bougies in strictures of the urethra.

In Spain, too, opinion was divided, some authorities siding with and some against Vigo's contentions.

GERMAN WRITERS.

In Germany the first serious attempt to write on surgery was made by a man who, though he had studied in Italy, knew no language but his own, and occupied a very limited field, the dressing of wounds, leaving to the irresponsible itinerant all major operations, and minor work to the barber-surgeon. This was a Bavarian, an army surgeon, Heinrich von Pfolspeundt. His treatise appeared in manuscript

form in 1460, but was not printed until 1868 (Berlin). Though gunshot wounds are not discussed they are alluded to here for the first time in any medical writing. The book also refers to the anesthetic of the period and to the art of rhinoplasty, the minute details of which are not furnished, nor does it give the name of the man who revealed to the author the secret of the Brancas, father and son.

Pfolspeundt classified wounds as clean or foul; preferred cold and styptics to the ligature, and believed in conservative delay in extracting penetrating weapons and putting in sutures. The description of how to repair a torn intestine by stitching it over a silver tube and securing it with green silk seems out of place in the work of one who was but a mediocre bonesetter, and turned over all important work to men of inferior standing.

Hieronymus Brunschwig (1450-1533) published a treatise on surgery in 1497, the earliest printed work on the subject in Germany. It is divided into chapters on various topics such as instruments, arrest of hemorrhage, stab wounds, methods of ligation, etc., but makes no reference to syphilis. It contains excellent woodcuts of great interest. Two years after the appearance of the surgery another work mentions the "French sickness" or "disease of the dead." Brunschwig did no herniotomies or lithotomies, the bugbears of surgery, but amputated, set fractures, and treated war wounds. He promoted suppuration by setons.

Hans von Gersdorff, another native of Strasbourg, vulgarly known as "squint-eyed Hans," published a "Field Book of Wound Surgery" in 1517. He had learned his business in several campaigns, having participated in at least two important pitched battles. Here we have a serious discussion of gunshot wounds. He did not suture the flaps of his amputations (he is supposed to have done 200) and produced partial anesthesia and a bloodless field by tight bandaging above the level of the amputation. He covered the stump with an animal bladder. While he did not hold to wounds being poisoned, he followed the practice of pouring hot oil into them. He used white of egg and hare's fur or a special styptic of his own containing galls, aloes, alum, and vitriol. The illustrations in his field book are striking and good.

An army field chest for drugs and dressings was devised by the noted surgeon Wilhelm Fabry (1560-1624), of Hilden, near Düsseldorf, who for years held the position of physician to the city and Canton of Berne. He was far ahead of his contemporaries both in learning and in practical skill. He used an ear speculum, extracted iron splinters from the eye by the aid of a magnet, amputated the thigh, and published a valuable report on his surgical cases. He was a contemporary of Johann Schultes, better known as Scultetus,

author of an interesting illustrated work on surgical instruments and appliances, whose name still survives in connection with the well-known head bandage. Janus Abraham a Gehema, a surgeon in the Polish Army, who wrote a field manual for military surgeons (1689), urged that Fabry's chest be supplied by the government instead of having to be paid for out of the doctor's own pocket and that the surgeons be salaried by the government instead of depending on fees. His efforts at reform accomplished almost nothing.

M. G. Purmann, of Lüben, Silesia, a surgeon in the Brandenburg army, did not, like Fabry, consider gunshot wounds poisoned, and he urged that they be not meddled with unnecessarily. He operated 40 times with the trephine, used a simple suture for wounds of the intestine, practiced transfusion, ligated for aneurism, and in many ways was a pioneer in military surgery. He antedated Ricord in the use of the speculum to diagnose and treat syphilis. He wrote a good deal and collected "Fifty Strange and Wonderful Cures of Gunshot Wounds" (1693). Though he insisted on a knowledge of anatomy as the groundwork of surgery he was not above accepting the prevalent belief in absent treatment (common in some forms of civil practice to-day) and applied salves to the weapon when its victim was not accessible, and employed the "sympathetic powder."

Raimund Minderer, of Augsburg, whose solution of ammonium acetate (*spiritus mindereri*) is still in use, was the author of a "Medicina Militaris" (1620).

ENGLISH WRITERS.

English barber-surgeons of the sixteenth century wrote on surgery and practised it in able fashion both ashore and afloat.

Thomas Gale (1507-1586) was clear-sighted enough to reject the prevalent idea that gunshot wounds were poisoned or burned, and apparently had conducted experiments similar to Maggi's—perhaps he knew of them—but he pottered with salves, ointments, and plasters, and his book on the subject is interesting mainly because it shows the low level of military surgery up to the time of Henry VIII. Gale had a special styptic of his own, but he makes no secret of its nature and appears to have been a good man and a faithful one. He had the good sense to write in English and to urge that, when foreign bodies were so difficult of extraction that the step threatened life, they be left alone. Gale relates that in one year he secured the services of 72 surgeons in London alone for the army and navy at the time when 70,000 men were raised for defence against the threatened Spanish invasion.

William Clowes, of Warwickshire, was present at the Massacre of St. Bartholomew, went with the Duke of Leicester to Flanders,

where he did a good deal of surgery, and served in the fleet that vanquished the Spanish Armada. He wrote clearly and illustrated what he had to say by clinical cases. In treating a gunshot wound of the abdomen he ligated and cut off extruded omentum, cauterizing the stump. He left long ends to his sutures for drainage and closed the belly by including in his waxed silk sutures everything down to and through the peritoneum on one side and the skin fascia and muscle on the other. He credits Guillemeau, instead of Paré, with introducing immediate ligation of vessels in amputations. He did not believe that gunshot wounds were poisoned except as they became infected from foul air, but a particular case having aroused his suspicions, he made experiments by shooting an arrow out of a musket, a whole sheaf of arrows out of a small cannon, and, noting that the feathers were not burned, he decided that the heat of the explosion could not purify the projectile. The belief prevailed at this time that bullets could be and sometimes were artificially poisoned. Clowes wrote on syphilis and a book called "Proved Practice for Young Surgeons." Associated with him for awhile in foreign service was John Banister, who, as a reward for his campaigning, obtained from Queen Elizabeth an order directing the College of Physicians to grant him a license to practice in London.

Peter Lowe (1550-1610) described himself as a "doctor in the faculty of surgery of Paris." He learned surgery in the Wars of the League and published a work on syphilis and "The Whole Art of Chirurgerie" (1597). The latter contains a good practical description of how to amputate using a bandage or tourniquet above the line of incision to stop hemorrhage and lessen pain, incising the periosteum, and either cauterizing or ligating the bleeding vessels. If infection exists the cautery is to be preferred. The ligation should include some tissue to prevent slipping. In 1599, by royal charter, Lowe, as surgeon, and Robert Hamilton, as physician, organized the Faculty of Physicians and Surgeons of Glasgow, with power to examine and license practitioners of both arts and to control the apothecaries. Nothing is said about barbers.

Richard Wiseman (1622-1676) was apprenticed at 14 to the Barber Surgeon's Hall in 1637, and at 21 began his career in the Navy of Holland, then at war with Spain. We do not know how long he continued in this employment, but when the civil war broke out in England we find him serving on the side of the royalists. He was the author of eight "Chirurgicall Treatises," in which ulcers, tumors, fractures and dislocations, venereal disease, gunshot wounds, wounds in general, the King's Evil, and diseases of the anus are discussed as to cause, symptoms, prognosis, and cure, the arguments being supported by illustrative cases from his own experience. Wiseman ex-

erted a marked influence on surgery in England and helped the movement for a dissociation of barbers and surgeons and their organization as separate guilds.

He taught that bullets in the neighborhood of joints and tendons should be extracted at once. When in the soft parts delay was admissible, but eventual removal was necessary because the bullet always carried along with it "rags which corrupt the wound." Wiseman was an advocate of primary amputation.

John Woodhall was surgeon general to the East India Company, had service in the Army in France, traveled for eight years on the Continent, and was one of the surgeons at St. Bartholomew's Hospital. He was the author of "The Surgeon's Mate," a book which long held the foremost place as a guide to the seagoing doctor. In this he treats extensively of scurvy, dysentery, and heat prostration, of instruments and dressings; mentions lemon juice, watercress, tamarinds, and wormwood, though their antiscorbutic value was already well known. In his *Viaticum* he expressed the opinion that gunshot wounds were not essentially different from other traumata except in their liability to concealed hemorrhage and infection ("dangerous disposition to gangrene").

John Moyle was for many years a surgeon in the Royal Navy serving against Holland and Tangiers and visiting Newfoundland and most of the Mediterranean ports. The first edition of his "Sea Surgeon" appeared in 1686. He offered it to the public not because he was better than other sea surgeons but because there was a call for such a book and no one had attempted to meet it. Moyle was not a scholar but a good practical man who went into all useful details. He describes the surgeon's chest thus: "And being on board see that your dressing box is furnished. That is to say a box with six or eight partitions in it and a place for plaisters ready spread. In the partitions you put your pots and glasses of Balsams and oyls for present use. Now this box as well as your pocket instruments must be carried every morning to the Mast between decks, where our Mortar is usually rung, that such as have any sore or ailment may hear in any part of the ship and come thither to be drest. But such as by reason of illness cannot come thither, you must go to them where they lye."

It is interesting to note his directions for preparing for "general quarters." "I will imagine that you are now at sea in a Man of War and in sight of the enemy and all men are clearing their respective quarters and fitting themselves for fight, at what time as you are Chyrurgion of the Ship you must prepare as followeth.

"First, see that your Allop or Platform be laid as even as possible with a sail spread smooth upon it, which you must speak to the Com-

mander to order. In Merchant men the Chyrurgeon's place is usually in the Cable Teer between Decks, but in Men of War 'tis in the Hold abaft of the Mast between that and the Bulk-Head of the Cock-pit from side to side. In this place you must have two chests to set your wounded men on to dress them. And at the corner of the platform you are to place two vessels, one with water to wash hands in between each operation and to wet your dismembering bladders in and for other services, and the other to throw amputated limbs into till you have opportunity to heave them overboard.

"You must likewise place good store of lights about the platform, in Lanthorns, but two of the largest (without Lanthorns) in the place where you are to operate. You must have there in readiness your instruments both large and small, and your first intentions must now be there ready with your restraining powders, rowlers, linnen, cross bolsters, tow, acetum, ova, broad tape to make ligature and narrow to bind on splinters (for apparel for fractures must not now be missing). Also basons to mix your restrictives in, pannikins to warm your oyls in and to dissolve your certos (which can be done over your large candles). Have likewise your cordial bottle ready at hand to relieve men when they faint.

"And your surgery chest must not be far from you, lest you should have occasion for anything therein—as the Traumaticks or other Vulneraries. And now being thus accommodated you are in a competent readiness for wounded men when they shall be brought down."

From the standpoint of this article Moyle's use of the "Royal Stiptic" for hemorrhage has little interest. The language of his reference to it, however, is germane to the subject. "In the last Holland wars we surgeons had a Royal Stiptic Water allowed us by his Majesty, and it was sent down to us aboard the Navy, to each surgeon according to his complement of men, with directions how to use it. And indeed I found it very good in divers cases, as in wounds of the Head, and other dangerous hurts; for when I have applied it and it hath remained on two days and I have opened these wounds again, I have found perfect and laudable digestion, when—as I did not yet expect it. But in case of amputations it was not found so proper, because the pledgets and compresses were to be wet in it, and to be with the hand held fast to the end of the stump till the blood should stop; the which in heat of fight we cannot spare time to do, but must be as speedy in our operations as possible."

Here we have a definite statement of a specific, therapeutic agent officially furnished by the authorities on the basis of a ship's complement, comparable to our use of supply tables. Again we have nice criticism of a remedy which, however valuable in itself, was

of limited use in battle. In other words, the "Royal Stiptic" is considered with respect to its availability for the surgery of war.

STATUS OF ENGLISH MILITARY MEN.

Patriotism, love of adventure, and the desire for enlarged surgical experience, then as now, drew men to the army and navy, but the inferior standing of the profession relative to the fighting branches, the poor pay, and the severance of home ties militated against permanent connection with either service. Not only civilian government officials, but generals and admirals have been slow to realize the necessity for according to medical men the recognition and encouragement readily conceded to those who have actual command. Strange to say, medical men in the naval branch, though more closely and intimately identified with the fortunes of their companions, their fate that of the ship, have always been more sharply discriminated against than their colleagues in the land forces.

A writer of the time of Henry VII thus describes the standing of the surgeon engaged for war service:

He that will be a surgeon in the wars must elect and choose him a captain of some noble, liberal man that loves his men well, and know what he will allow his surgeons a day. If he be a nobleman that is your captain, he will allow you, as others do, two shillings a day to the chief surgeon and the second 1s. 9d., to the third 1s. 4d., and also a groat apiece of every soldier every month. His balderic must be of his master's colours about his neck, with a spatula before, and behind with the King's arms in like manner. Besides (he can count on) the cases that he will have abroad among nobleman and other soldiers, if he be perfect in his science, and be well acquainted, gentle, close, honest, and merry. Also know what your master will allow unto your coffer. Some noblemen will allow, if they are liberal, twenty nobles, some five pounds, some five marks. The captain will carry your coffer, or else you must have a waggon with a horse or two amongst you, wherein you shall put your tent, your chests, your bedstead and bed, and your clothes, two or three shirts, two or three pairs of hose, your cassock or nightgown, your hood and hose of frieze, your high boots and ford boots, your various shoes, and other things necessary for a surgeon.

Edward IV and Henry VIII exempted surgeons from serving on juries with the understanding that they must be available for service in time of war. This might be regarded as a foreshadowing of the idea of military reserves. During the seventeenth century it was required of surgeons embarking on board merchant vessels that they obtain a license from the Barber Surgeon's Company. This body also examined their instruments and surgeon's chest. The Barber Surgeons of London were directed in 1626 to impress surgeons for the campaign against La Rochelle and again for the fighting in Scotland in 1639 and the Dutch war in 1672.

During the seventeenth century the pay of a regimental surgeon appears to have been 1 shilling a day in the infantry and 2 shillings

in the cavalry. The naval surgeon's pay was 1 shilling. Gradually the positions of staff surgeons and of surgeon's general and physician's general were established. Field hospitals and clearing stations were used in the campaigns of William III in Ireland. St. Thomas, St. Bartholomew, and other London institutions were assigned for use as military base hospitals when occasion demanded, and in 1652 there was a convalescent home for soldiers at Bath. Marlborough was an example of the military commander who exerted himself to improve war hospitals, and both male and female nurses were employed in them, but we are still in the era where proper attention to the sick and wounded depended on the leader's disposition and not on the deliberate forehanded action of the same government which planned for munitions and ships.

In the English and Scotch troops serving on the Continent during the reigns of James I and Charles I a surgeon with pay of a captain was assigned to a regiment of 1,800 men, and each company of 150 had a surgeon with the rank of ensign. The cavalry and ordnance were also furnished with medical officers. Medical stores were forgotten, however, and there was much suffering in consequence. Charles had so much difficulty in securing surgeons that in 1628 the Surgeon's Company was ordered to impress 16 reliable men to accompany the relief expedition to La Rochelle. The Scotch troops serving in Sweden in 1630 had four surgeons to a regiment of 12,000 men. It was in the middle of the seventeenth century that the army in Ireland introduced the rank of physician general. The East India Company had its surgeon general and surgeons. Medical outfits, which included lime juice against scurvy, were provided for the company's ships. During the Civil War that led to the establishment of the Protectorate the best men of the day were to be found serving on either side. Harvey was physician to Charles I. Sydenham held the rank of a captain. Richard Wiseman was the leading light among the surgeons of the Royalists. He amputated above the level of the disease or for gunshot injuries of joints, and was the first writer to describe tuberculosis of the joints.

Of all these English medical campaigners we note that they served indifferently with land and sea forces as exigencies demanded and during those exigencies only. There was no such thing as life-long service with army and navy, for ships were only hired and commissioned as required and regiments were disbanded in times of peace. And throughout the eighteenth century, the period of the great pioneers in naval hygiene, Lind, Trotter, and Blane, surgeons and physicians came and went in the navy and in the army. England was almost constantly at war in the eighteenth century, and

indeed from the fourteenth century the services had been schools of surgery, but professional men were only too eager to leave army and navy when they had acquired proficiency. A review of the leaders of medical science in Great Britain in the eighteenth century furnishes a long list of men who profited by these opportunities. Among others may be mentioned William Hewson, the physiologist, who studied coagulation of the blood. He served in the army. John Monro, the father of anatomical study at Edinburgh, served with the army. John Hunter's knowledge of gunshot wounds was acquired in the expedition to Belle Isle (1761) and in Portugal.

THE BEGINNING OF ORGANIZED EFFORT.

Charles the Bold, Duke of Burgundy, is credited with being the first European monarch to attempt some systematic provision for sick and wounded troops. He employed a barber or barber-surgeon for every 800 men over and above his own doctors and those attending his generals. He had four surgeons for himself and allowed them to treat distinguished foreigners in his employ. Sometimes they were allowed to treat the poor without charge, when the duke himself paid for the salves and drugs required. These surgeons had the run of his apartments at all hours and enjoyed other privileges accorded to his six physicians. The latter stood behind their master at meals and advised him what to eat and what not to eat. Maximilian I, who married Charles's daughter, Mary of Burgundy, sought to promote the efficiency of his troops by organization, but it was his grandson, Charles V, King of Spain and Emperor of Austria, who first developed a real medical organization which took cognizance of discipline and sanitation and of transportation, treatment, and hospital accommodation for the sick.

The sixteenth century marks the birth of a rudimentary sanitary conscience in military administration, as evidenced by such publications as Anton Schnieberger's treatise on "Keeping Fit in the Army," the actual title being "*De bona Militum Valetudine Conservanda*" (1564). Fronsperger writing on courts-martial and other military concerns mentions certain sanitary regulations for the imperial landesknechte. This age saw the tentative adoption of field hospitals. The more common plan was to send the sick and wounded to the rear, where in the baggage train they obtained such solace as they could from food and drink and were treated by the surgeon or barber and perhaps nursed by some of the women who were present in large numbers as camp followers. When the army advanced the disabled were carried in wagons or transferred to civil hospitals in the nearest town. Barbers and surgeons (other than those attached to the persons of the commanders) and amateur female nurses had

always been numerous in the throng of hangers-on of medieval European armies, but they were "irregular" not only in their morals and mode of life but in their professional practice and in their methods of obtaining compensation.

The feudal system and the age of chivalry had now long passed away, and the use of gunpowder and cannon had revolutionized not only the character of warfare but the constitution of armies. At the battle of Crecy the flower of French knighthood was vanquished by English archers who belonged to the great middle class. The professional soldier, the man whose whole business in life was to fight as compared with the early feudal retainer or the patriotic volunteer of later times, had been developed out of the condottieri of Italy who organized bands of trained soldiers and espoused now one cause and now another, selling their services to the highest bidder. Step by step with this system there developed in Europe the standing armies made necessary by the almost continuous wars of the sixteenth and seventeenth centuries. It was under Charles V, that mighty war lord, on whose dominions, extending from France, Austria, Germany, and the Netherlands to Spain and the New World, the sun never set, that the standing army was fully organized; and he was perhaps the first monarch to attempt definite provision on a large scale for the care of the sick and wounded. Under him system was introduced, and the professional attendants were impressed or regularly hired: there was definite provision for pay, and some attempt to get men of competence to supervise their work. Following the example of his grandmother Isabella, Charles provided tents for the sick, to which barbers were assigned. The doughty landesknechtes, who terrorized the people of Protestant Holland and sacked the capital of the papal dominions, were in the habit of electing from among themselves a spitalmeister or hospital overseer, for whose salary they themselves subscribed. He was specially charged with the welfare of sick and wounded. "For a force of 5 to 10,000 men there was a field physician in chief with a barber assistant. A field marshal of cavalry had a physician, a chief of artillery, and a barber assigned him. Each independent troop, each infantry company of 200 men, and each squadron had a field barber. It was the province of the captain or troop commander to select a reliable barber, see that he was moderate in his charges, attended to his duties, slept at a definite designated place at night, so as to be available when needed. The barber ranked with a sergeant or corporal. He charged a fee for his services, but drew double pay. The physician in chief was chosen for his skill and experience, and saw to providing instruments and dressings, and regulated the work of his subordinates. In all disputes about charges he acted as referee, and

he selected the site of the barber's station in battle, he himself sticking close to the commanding officer. There was no medical examination of recruits, and no pensioning of the permanently disabled. They became brigands or beggars according to their temper and the degree of their invalidity."

In France two years before the siege of Metz, Admiral Coligny had secured the issue of a royal decree authorizing the assignment of a surgeon to every company, both for garrison and campaign service, who was paid from a tax on the fund for the company pay.

The siege of Metz (1552) is remarkable not only from a military and political point of view but in the history of military medicine. Opposed to Charles V, whose armies were systematically provided for, was the Duke of Guise, who demonstrated what could be accomplished without rules and regulations, but by the care and forethought of a leader at once chivalrous, humane, intelligent, and well informed. Not only did he make every possible military preparation for withstanding the siege by procuring ample supplies, setting everybody to work on the defences, organizing the citizens into working parties, etc., according to their several trades and capacities, but he tried to put the place on a sanitary footing so as to reduce the likelihood of sickness and pestilence. The streets were swept and cleared of garbage, contagious cases were promptly isolated, and the sick and injured removed to places of succor. He advanced money for the purchase of medicines and instruments, and when it was suspected that the drugs in the city had been poisoned he applied to the king for a fresh supply. It was on this occasion that Paré was dispatched to the scene with an assistant and an outfit and began to be generally recognized not only as the foremost military surgeon of his day but as the friend of the common soldier. He was smuggled into the beleaguered city through the aid of an Italian captain in the imperial forces who had been bribed with the sum of 1,500 écus.

Ambroise Paré was surgeon in turn to at least two of the sons of Catharine de Medici when they occupied the throne of France. He was far more than an attendant upon kings and a nobler title for him than "Father of Modern Surgery" would be the "Surgeon of the Common Soldier," for he delighted to work for what we would call to-day enlisted men and lavished skill and kindness upon them.

Guise treated his prisoners with consideration, in marked contrast to the conduct of the French when they were the besiegers of Metz a hundred years before, and amused themselves by drowning their prisoners. Charles's army, attacked by dysentery, frostbite, scurvy and typhus, lost 20,000 men from sickness, and the siege was raised and the retreat begun in great haste on December 26, many of the

sick and wounded being abandoned. The Duke of Guise showed these unfortunates every attention, not only directing Paré and his staff to treat them, but recovering them into the city, where they were housed, fed, and nursed. By special request of the Spanish commander in chief, a sick Spanish officer was actually sent into the city to be treated. As a result of his magnanimous policy to the enemy, typhus, from which the city had been free all during the siege, was introduced into the city. Guise offered to provide well-covered boats to assist the wagons he had furnished to convey prisoners and other wounded to his enemy's point of retreat. In not burning the enemy's camp or massacring prisoners Guise exhibited that humanitarian spirit which is now recognized as part of civilized warfare. Henry IV in his Flanders campaign required his surgeons to treat wounded prisoners with the same care and kindness they displayed to their own people, and in this he was followed by Gustavus Adolphus of Sweden, and this liberality gradually became general.

Sully, the faithful friend and able minister of Henry IV, who did so much to rehabilitate France in respect to agriculture, commerce, finance, and government after the long civil and religious wars, established a field hospital at the siege of Amiens (1597), which was an improvement over all previous provisions of this nature. It was maintained at the expense of the sutlers, wine sellers, tavern keepers, tailors, clothiers, shoemakers, that hung on the skirts of the army, and directed by Pigray, a pupil of Paré.

Perhaps the first recorded instance of real solicitude for what we would call the comfort of the soldier dates from the siege of La Rochelle, when Cardinal Richelieu appointed certain persons to distribute hot broth to the troops and to search for those requiring medical attention and minister to them whether they asked for help or not. His ordinance of 1638 provided that vegetable soups and broths should be distributed by Jesuits and cooks to such sick as did not wish or require to go to the hospital. To the priests and lay brothers and to the cooks and their assistants designated for this task a certain number of sheep and wagons were assigned, based on the numerical strength of the fighting force. It was Richelieu, too, who established the first permanent hospital at the front in war time. This was for the army in Italy (1630) and was located at Pinerolo in Piedmont, a place which has recently come into notice again as the seat of one of the cavalry schools where the wonderful riders of Italy's army are trained. Such institutions were under a "surgeon major of camps and armies," a new title.

Richelieu did much in other ways to systematize the conduct of military affairs, particularly in the commissariat, which was man-

aged by civilians directly under the ministers; but in 1635 there was still no transport system for the sick. In the campaign of 1635 on the Rhine Marshal Turenne on one occasion had the carts loaded with his personal baggage, plate, etc., to be emptied so as to accommodate the wounded, and he even took a wounded soldier to a place of safety tied to his own charger while he walked.

A hundred years passed before countries like Austria, Prussia, or Sweden provided anything comparable to this for troops in the field, continuing to rely on tents, sick quarters, billeting, and civil hospitals. Under Louvois, the great military reorganizer and war secretary to Louis XIV, permanent or garrison and port or naval hospitals were established throughout France, and after 1666 in all the cities which the great military engineer Vauban fortified throughout the Low Countries and Alsace he selected a site for an army hospital.

Louis XIV, who did so much to promote surgery and surgical instruction, sent three of the ablest surgeons of Paris to the army in Flanders and designated Turtrère consulting surgeon-major of camps and armies. The others were Gayant and Bienaise. At the battle of Seneffe, 1674, 230 military surgeons, assisted by nurses and provided with all needed stores and instruments, were distributed in three villages to care for the wounded.

HOSPITALS, ASYLUMS, AND PENSIONS FOR VETERANS.

We have seen that a home for disabled mariners was established by the Republic of Venice in 1318, with Gualterius as superintendent and medical officer in charge. The idea was not original with Venice, for King Philip Augustus in the twelfth century planned a retreat for soldiers. Louis IX founded an asylum for blind crusaders to the number of 300. In the thirteenth century a charter was granted the Chevaliers de l'Etoile for caring for the disabled. In 1558 Bloody Mary provided in her will for such an establishment, and in 1563 Catharine de Medici promised one. In 1600 Maximilien Bethune, Baron Rosny and Duke of Sully, actually founded the *Maison Royale de Charité Chrétienne*, which practically abolished and replaced the *droit d'oblat*. It depended for maintenance on whatever surplus could be extracted from the budget of charities, religious institutions, etc. The applicant for admission must be armed with a certificate from his commanding officer as to his length of service, its character, the number of his wounds, and the occasion when they were contracted. The *droit d'oblat* dated from an early period of the Carolingian dynasty. It assigned aged and decrepit soldiers to monasteries, convents, and churches where, as lay brothers, they rang bells, swept floors, and performed other menial services in return for their keep. This was a very limited and unsatisfac-

tory arrangement and in France the disabled often became beggars. In the reign of Henry II and Francis II so many crippled and wounded soldiers and so many widows of fallen soldiers flocked to Fontainebleau to solicit alms and present petitions that the Cardinal of Lorraine erected a gibbet directly under the king's window and threatened the invaders with death if they did not depart within 24 hours. In civil life, until our own day, there was comparatively little attempt to ameliorate the condition of the poor except by charity administered in a way which actually encouraged begging as a profession. Juan Luis Vives, a Spanish scholar of the sixteenth century who studied in Paris and later taught both at Louvain and Oxford, wrote a widely read book dealing with the management of the poor. He aimed to reduce begging and to restrict the activities of the deformed and maimed so that they might not annoy or disgust the people frequenting streets and highways.

After the assassination of Henry IV, the *Maison de Charité* declined little by little owing to lack of funds, and under his successor, Louis XIII, who actually began a new establishment on the lines of Sully's *Maison*, which proved a failure and was assigned to the hospital of *Là Salpêtrière*, a pension of 100 livres was established instead of furnishing an asylum.

In 1633 a Commandery of St. Louis was founded to care for pensioners, but proved ineffectual. The erection of a *Hôtel des Invalides* was projected in 1659, but it was not in operation until 1676. Louis XIV had tried the pension system and found it a failure. Begging soldiers became such a pest that the king ordered them to be hanged and imposed a heavy fine on any person giving them alms, but the nuisance nowise abated and he returned to the institutional idea. As the monasteries could not be relied on for the support of the new *Hôtel des Invalides* two and later three deniers were appropriated for the purpose out of every livre voted for military enterprises. During the war of the Spanish Succession this tax brought in fully a million livres and no trouble was subsequently experienced in obtaining necessary funds by this device. In the 28 years that followed the opening of the *Invalides* there were some 15,000 applicants for admission. Its capacity averaged about 3,000 inmates—decrepit, senile, cripple, helpless, or idiotic. In the case of the bedridden or utterly helpless a more robust companion was detailed to his care and received special allowances in return. Shoes, clothes, a small sum of expense money, and good food were provided for all. Military discipline was maintained and those who wished to do so were encouraged to work. Leave was granted to those who had families, and where men could perform some duty they were assigned to garrison duty on half pay. From the practice of granting leave and of

assigning light military duty grew up a new and adequate pension system as the partly disabled veterans would often go on extended leave and their various allowances were commuted. Thus in 1790 there were some 2,000 resident pensioners at the Invalides and 26,000 pensioners scattered in various parts of France.

In England in 1614, Sir Thomas Coningsby founded a relief for destitute soldiers in Hereford. During the Protectorate the British Parliament provided homes and pensions for the disabled and destitute soldiers who had fought under Cromwell but did not extend these benefits to the Royalists. Charles II, who in spite of a bad name should be remembered as the author of many important reforms, projected both the Royal Hospital at Chelsea for soldiers and the Government Hospital for Sailors. These institutions did not begin operations until the reign of William and Mary.

In the middle of the seventeenth century the present site of the Royal Naval Hospital at Stonehouse was occupied by the ruins of an abandoned abbey. Before this wounded seamen had been treated in a building on George Street, Stonehouse. The present Royal Naval Hospital, Plymouth, was begun in 1758, patients were first received in 1760, and the buildings were completed 1762. The establishment was controlled by a council composed of the physician, the surgeon, the agent and steward, under the Honorable Commissioners for Sick and Hurt Seamen and Marines. Much discord marked the early administration and led to the appointment of an executive officer as governor at the Royal Naval Hospital. The relations of governor and staff were not very cordial at first, but the situation was not as bad in this respect as at Haslar. (When the first governor and two lieutenants—line officers—arrived to take charge at Haslar the doctors received them with much mock state.) The sick and wounded from Sir John Moore's army in the peninsula were treated at Haslar. Trouble with the governor increased about this time. He insisted that the guard should turn out for him and the drums beat a march when he passed. A young Irish officer directed the sergeant who sought instructions to play the rogue's march. Governor was delighted—he did not recognize the tune—but everybody else nearly died laughing.

The first governor of Plymouth was Richard Creyke, a post captain in the Navy. He held office 27 years. On the occasion of reporting for duty he made a tour of inspection with his staff and found "everything in perfect good order." From 1846 on, numerous representations were made by the doctors, who objected to having line officers in command at the hospital. The practice was abolished in 1870 and the chief medical officer put in control. Under Creyke the hospital was regularly illuminated to celebrate all naval victories.

On the occasion of an explosion on the *Amphion* a woman was received as a patient through motives of humanity and entered on the patient's roster as a nurse. When in 1797-1798 there were serious mutinies in the fleet at Plymouth, the hospital supplied coffins for the mutineers who were hung. The staff of the hospital consisted of a physician at a salary of £300, an assistant physician paid £250, a surgeon at £230, and an assistant surgeon at £200.

Creyke's diary for April 24, 1799, reads: "Mr. Fuge, 1st Surgeon, grossly insulted by Mr. Hammick, one of the Asst. Surgs." From the governor's diary of September 25, 1797, we learn that the chaplain's salary was increased to £100, with an allowance of 1 shilling every time he read the burial service! Nurses numbered from 49 to 100—they were probably a bad lot. One notes many entries of discharge or fine for getting drunk and for selling liquor to patients. Creyke had to direct the matron to always keep back a month's pay, so nurses could be checked for linen and stores which disappeared. Nurses used to help patients run away from the hospital. The proposal to put bars on the lower windows was not acted on because patients did not get out that way, but were helped by the nurses. Many were the breaches of discipline. For a time a marine guard stood watch at the gate.

The entry of March 10, 1796, tells how a soldier with a very bad record was charged with stealing clothes. He accused the sentinel of having helped him, but his accomplice was really a woman who sold fruit in the hospital. The governor sent him back to his ship with his hands tied behind him and a big label on his back, "thief." On one occasion a woman threw arsenic over the inclosure wall so her son could use it to produce artificial sores on his body.

The capacity of the institution at this time was 1,200 patients. In 1780, during the war with France, the hospital had 1,423 patients. In 1795 the total expenses of the hospital were £13,000; of this £2,000 went for wine. Usually the physicians prescribed white wine and the surgeons red wine. Wine and porter were a source of constant worry to the governor. The Sick and Wounded Board was always urging him to cut down on these items. He tried the expedient of putting quassia and quinine in the wine.

Both at Plymouth and Haslar the main drain was constantly used as passage for smuggling liquor. In 1798 the Admiralty authorized the governor to discharge patients reported by physician and surgeon as unserviceable through confirmed consumption or incurable hernia. In 1798 the Sick and Wounded Board authorized inoculation against smallpox for such persons as wished to come to the hospital for the purpose. The physicians and surgeons objected.

From an early period of our history liberality has marked the American attitude to those disabled in war. Sixteen years after

the founding of the Plymouth Colony it passed a law providing for the support of the maimed soldier. The Virginia Assembly eight years later created an adequate system of relief for the wrecks of war, and scarcely had the Revolution begun when Congress ordained that officers and men incapacitated during the war should receive half pay. Our first definite pension law under the Constitution was passed in 1792. To-day our aim is to make the disabled soldier a beneficiary under legal provisions and independent of public charity, and by reeducational and vocational training to preserve his usefulness as a working member of society. The abuses of the pension system flow from greed; from the feeling widespread, even among otherwise worthy people, that it is permissible to cheat the Government; from the political influence accruing to those who procure pensions or provide positions in the vast army of pension agents, but there is nothing in the system to lower the self-respect of any disabled soldier who is honest and upright.

SEA SERVICE IN THE EIGHTEENTH CENTURY.

In the absence of ice machines and cold storage, fresh meat and vegetables were only available during the first few days after leaving port, and as the ships of the eighteenth century often kept the seas for months at a time the fare consisted mainly of salt meat and hard biscuit. Such a diet, combined with lack of ventilation in dark, damp, overcrowded quarters, meant constant sickness. Scurvy was the scourge of the sea. It was no uncommon thing for a ship to lose a third or a fourth of its crew from this cause alone during the course of a long voyage. Naturally this disease was more prevalent when the exigencies of war lengthened the periods between ports. It also prevailed extensively ashore in prisons, garrisons, and camps, and in armies in the field. When Lord Anson made his famous four-year voyage around the world four out of every five men in his squadron had died of scurvy before he got back. Lind saw 350 cases of the disease in a single voyage of less than three months. The British Channel Fleet in a voyage of 10 weeks had 2,400 cases. Though Lind wrote and agitated for reform and proved the value of the remedies suggested, it was not until 57 years after his appointment in the Navy that lime juice was made compulsory (1796).

To-day our largest warships, vessels of over 30,000 tons, with decks 70 to 100 feet broad and measuring 500 to 800 feet from stem to stern, carry from 800 to 1,100 men. In the days of the old wooden ships which we are describing a ship of from two to seven hundred tons and less than 200 feet long would have a crew of from 800 to 950 men. It took 8 men to handle each of the 40 to 75 guns carried by

the old frigates and ships of the line, and 4 men to each carronade. and for long voyages an excess of men was needed in view of anticipated loss from disease.

In 1753 Dr. Stephen Hales devised a system of artificial ventilation for ships by means of numerous small air pumps and wind-mills. How beneficial this was may be judged from the statement of the Earl of Halifax that for every 12 men dying on unventilated ships there was but one death on those which employed the new device.

The majority of the British captains had a passion for cleanliness, and the majority of them tried to secure it by constantly flushing the decks with salt water, so that there was perennial moisture both within and without. As the timbers from which the ships were built were often green and as sometimes they were purposely saturated with certain pickling solutions under the mistaken idea that this would make them last longer, these old-fashioned men-of-war reeked with dampness and favored the development of rheumatism and consumption. To make the picture complete we must add to the bad food and the bad lodging the universally harsh discipline of the older navies. Captains were all-powerful and, though many of them were esteemed kind-hearted and just, their conception of their own dignity and their ideas of discipline made of their rule the harshest tyranny. Flogging with the cat-o-nine-tails was a universal and favorite form of punishment, often inflicted for very trivial offenses. Flogging was made a ceremony which all hands were called to witness. The hardened villain deserving of punishment was left with a back stripped of skin, red and bleeding like a piece of raw beef, but the punishment did not change his morals or conduct. On the other hand, the man of a higher type had his spirit broken and never amounted to anything afterwards or else nourished in his heart a spirit of bitter resentment, leading later to deeds of violence, desertion, or mutiny. When flogging was ordered for a really criminal breach of the moral or military code the culprit was ordered "flogged through the fleet"; that is to say, he was taken in a boat and flogged at the gangway of every ship in the formation. The unfortunate victim usually died from the effects of flogging through the fleet, and it was practically the equivalent of a death sentence.

Conditions of life such as we have outlined did not make the service popular. When we further consider that in time of peace ships were commissioned for a three-year cruise, at the conclusion of which the men were paid off and discharged, we can readily understand that upon the outbreak of war it was difficult to get enough men to man the ships. This led to the practice of impressment, one

of the most cruel and unjust measures ever enforced by civilized government and a marvelous anomaly in a people so devoted as were the British to liberty and the rights of the individual. When a British man-of-war entered a home port short of the required number of men, the captain simply sent an armed party ashore with orders to seize by force and bring aboard enough able-bodied young men to make up the deficit. The orders were literally obeyed. The victim might be a merchant sailor just home from a long cruise on his way to visit wife or mother; he might be a discharged soldier fresh from a foreign campaign, or he might be a luckless yokel going to or returning from market. Many were the times when it was dangerous in the seaport towns of England for a citizen of fair stature and average health to leave his house after nightfall, whether bound for church or tavern. If he crossed the path of the press gang his family might wait months to get news of him. Years might pass before his return. He might never be seen again. British men-of-war also recruited from vessels they fell in with at sea, regardless of nationality, and we went to war about this in 1812.

With a crew composed to any extent of impressed seamen frequent desertions were to be expected, and so when the country was at war ships might come into home ports for orders, for supplies, for ammunition, and for more recruits, but leave or liberty was not granted to the men. The only concession made to them was that they were allowed to receive visitors, and so, during a stay in port, the ships were thronged with women who gave themselves out to be the sisters, wives, cousins, or sweethearts of the men. The more brazen of them made no such pretense! The master-at-arms standing at the gangway searched them to prevent liquor being brought aboard, but somehow or other the liquor came nevertheless. Besides, there was a daily ration of beer or rum for all hands, and when a ship was due to go into port the men often saved up their allowance so as to have a good time when the ladies arrived. The result of it all was that these brief respites from the trials of life afloat almost invariably degenerated into the wildest orgies.

Modern voyages are short and made amidst comfort and luxuries, often greater than those enjoyed at home, and anyone whose acquaintance with the sea has been limited to a six-day passage across the Atlantic on a palatial modern steamship can form no conception of the monotony and privations, the loneliness, the discomfort, the depression, which attend a voyage of two or three months. It is still harder to picture what life must have been on a fighting ship during either peace or war two or three hundred years ago. The truth of the matter is that the liquor served out to the sailor was his only joy, comfort, and surcease from sorrow. Small wonder that many of them deliberately drank themselves into insensibility.

It was not until 1857 that a uniform style of clothing was adopted for the seamen of the British Navy. First Lind, then Trotter and Blane, advanced convincing arguments as to the value of a uniform as a means of making desertion harder, of creating esprit de corps, and of conferring an honorable distinction on those in the King's service. Before 1857 the men clothed themselves as they pleased, though the captain usually required the crew of his gig to be dressed alike. When Lord Anson during his voyage around the world went up to Canton to visit the viceroy he put the 18 men and the coxswain of his boat in a costume resembling that of the watermen of the Thames. They wore scarlet jackets and blue silk waistcoats liberally adorned with silver buttons and had silver badges on jacket and cap. Usually the men of a given ship wore clothes of approximately the same type, because each ship had a slop chest or ready-made tailor shop on board where men outfitted themselves as they pleased, and the garments supplied from each slop chest followed a more or less definite model. (The slop chest dated from 1650.)

When at work the British tar was apt to be a rather disreputable and only a half-dressed individual, but for muster or going ashore he arrayed himself in some kind of smart blue jacket, white trousers; and small narrow-brimmed hat. He loved to decorate his good clothes by the insertion of ribbons here and there and wore a pigtail in imitation either of the marines or of the French sailor.

When an enemy ship was sighted preparations were at once made to give fight. The decks were strewn with sand to keep them from being slippery when the blood began to flow. The men at the guns stripped to the waist and rolled up their trousers to the knee (bell-mouthed trousers are conveniently rolled up). Powder and shot were brought up from below and placed in readiness near the guns. Hammocks, mattresses, and bedding were piled against the bulwarks and all superfluous articles made of wood were thrown overboard, because what everybody dreaded most was not the cutlas or the cannon ball of the enemy but the wooden splinters torn from the masts, the spars, and the ship's side by the enemy's shot and shell. The huge wooden splinters which flew everywhere made the most ghastly and painful wounds. Next to the splinter wound the sailor dreaded fire and explosion on his own vessel. There were of course no electrical primers and firing devices in those days. The guns were set off by igniting a small powder charge with slow burning fuses or matches and so it was not uncommon for kegs of powder to ignite, especially when heated shot were used in the hope that they would set fire to the enemy vessel as they passed through its wooden sides.

The ships of England, France, and Spain in the eighteenth century carried a surgeon or surgeon's mate, or both, according to their size

and rate. During Nelson's time the pay of a British naval surgeon on appointment was 4 shillings a day. After 10 years it was 11 shillings and after 20 years 18 shillings, but comparatively few doctors remained on active duty so long, preferring to go on half pay and engage in private practice ashore. They were required to buy their own instruments and when they felt that they could not afford to do so they borrowed saws and knives from the ship's carpenters. As a measure of economy the use of lint was forbidden by regulation and the supply of sponges was so limited that they had to be used over and over again. The scene of their activities in battle was known as the "cockpit," a small, gloomy, unventilated compartment deep in the bowels of the ship, lighted by a few candles or lanterns. The horrors of this place were so well known that men almost preferred death to wounds requiring operation. Here the surgeon set out his long amputating knives, bandages, and spirits. The rule on English ships was to take the wounded in the order in which they came regardless of the nature or severity of the case. This was a democratic rule and inspired the men with a certain confidence, knowing that they would be treated without regard to rank or precedence, fortune or favor, but it had serious disadvantages. The man or officer who needed to have an artery tied might bleed to death while the shipmate ahead of him in line was being treated for a less urgent condition. The circumstances did not favor elaborate surgery. The mangling, tearing and bruising of the flesh produced by flying splinters made infection a certainty. Facilities for skillful nursing were lacking. Hence the rule for most injured limbs was to amputate. If a hasty examination suggested that a wounded man was too far gone to survive he was carried on deck and thrown overboard. Otherwise he was anesthetized as far as possible by opium and liquor, given a piece of leather to chew on and put on the table. A few swift passes were made with the gleaming knives, the spurting vessels were deftly tied, bandages were hurriedly applied and the job was done. British surgeons were in the habit of scalding their amputating knives (and our Colonial medical officers imitated them in this), supposing that a hot knife was less painful than a cold one. This must have been beneficial as an aseptic measure. The patient was laid to one side and the next unfortunate took his place on the table.

Not every wounded man got below to the surgeon. If his condition was so desperate as to preclude all hope of recovery he stood a good chance of being thrown overboard, and perhaps this seemingly cruel measure was the kindest thing after all. In the French and Spanish navies a great point was made of carrying home the bodies of the dead, but during an engagement the British flung the dead into the sea without ceremony, considering that their first duty

was to fight the ship and to win at all costs. When Nelson was mortally wounded at the Battle of Trafalgar he fully appreciated the gravity of his condition and begged Hardy, the captain of the *Victory*, not to let him be thrown overboard, saying that if the people did not want to bury him in St. Pauls he wished his body sent to his father's parsonage.

A striking and beautiful characteristic of the British fighting ship was the generosity and kindness displayed by the officers to the men after an action. The surgeon could get anything in the way of wines or delicacies for the use of his patients which the captain's or the wardroom pantries and lockers contained. A similar spirit was manifested in times of peace for cases of sickness. The same thing has always been true in the Navy of the United States, though the difference between the accommodations and food for officers and those for men is not so vastly different to-day, as it used to be. The fact that the enlisted men are fed by the Government whereas officers pay for their food out of their own pockets is never considered, and our officers, from the captain down, are always eager to give up their quarters, their clothing, and any dainty or nutritious article of food on their table to further the recovery of a sick or injured shipmate. But the available benefits of a humane and charitable interest are not the equivalent in the long run of an authorized and standard supply of necessities and comforts for the sick, and governments have no right to impose taxes for the support of a military establishment and then expect the taxpayer to supplement the inadequacy of an official program by voluntary contributions. Benevolent organizations are of service in great emergencies because unusual expenditures by Government officials must be authorized by law, and this involves delay. What the public calls red tape is in many instances only the protection of the public purse, welcome enough under ordinary circumstances, a terribly hampering feature in moments of urgent necessity. Once the critical exigency has passed, charitable and benevolent organizations should exert themselves to help soldiers and sailors by securing legal authority for more liberal supplies, rather than by making direct contributions. The tendency is the other way—to maintain large numbers of employees and raise funds by solicitation, which is not economic and makes the recipients the objects of charity. Begging, "tagging," bazaars, fairs, concerts, and dances are methods of raising money which bring obloquy on the contemplated beneficiaries.

In the several famous mutinies which occurred in the British Navy toward the close of the eighteenth century (notably the one at Spithead, 1797), one of the chief complaints of the men was of inhumanity to the sick and wounded, but the most general cause

of dissatisfaction was the poor food. The "inhumanity" referred to must not be interpreted as a reproach to the naval surgeons of the day, who were for the most part zealous and kind, but certainly the official provision for the sick and wounded was parsimonious in the extreme, and their welfare still depended largely on the temper and disposition of individual commanders instead of being assured by enactments of law. The three great medical officers of the period, Lind, Trotter, and Blane, sought by their representations to the Admiralty and in their published works to have all matters pertaining to health and hygiene under *statutory regulations*. Undoubtedly their worthy efforts were greatly furthered by the well-known interest which such men as Collingwood and Nelson displayed in the health of their crews.

Blane in his "Observations on Diseases of Seamen" insisted that no naval or military body would accomplish much in the preservation of health so long as the subject was left to the discretion of the individual commander. He urged that sanitary rules and regulations based on scientific practice had to be drawn up by those having such knowledge and then promulgated and enforced by a supreme authority.

Throughout the eighteenth century it appears that there was no sickbay proper on the British man-of-war. The so-called sick berth was merely a designated place where the sick could swing their hammocks, and it might be in forecastle or on the forepart of the main deck. Blane defined the sick berth as the place assigned for the sick, such as the interval between two guns or some space between decks formed into a sort of apartment by means of a canvas partition. He recommended putting all the sick together on one side, so as to leave on the other a passageway for men going to and from the head, as otherwise the sick were liable to be disturbed by the thoroughfare and more liable to transmit their contagions to others. He also emphasized the importance of assigning some place for the isolation of contagious cases. Though employed in a desultory way, Jenner's vaccination against smallpox was not made compulsory in the Royal Navy until 1858.

The practice of paying off men at the end of a cruise and of putting ships out of commission in a wholesale way at the conclusion of a campaign meant a scarcity of men when war began again, and this helped to keep up the vicious institution of the press gang. The evils of impressing men for the Navy were recognized and guardedly alluded to more than once by Blane. He has nothing to say about the right or wrong of the method, but deemed it inexpedient from the point of view of health and morale, frequently comparing the health, energy, bearing, and usefulness of men who were impressed with the qualities of those who volunteered, to the disadvantage of the

former. The recruits collected by the press gang were examined by the captain and surgeon of the ship when they arrived on board. In Blane's time it gradually became the custom to have such recruits stripped and bathed as soon as they were delivered on the ship or the hulk, and they were either required to procure an outfit from the slop chest or else to have their clothes smoked and scrubbed. The harvest of the press gang was a constant and prolific source of contagion. Trotter boldly attacked the system of impressment in memorials to the Admiralty. In his published works on naval medicine he described its noxious effects on morale and discipline and its large contributions to sickness in the personnel, declaring it contrary to the avowed principles of English liberty and government. He favored the regular employment of the "bounty" system temporarily put into force by William Pitt.

One of the painful duties of a naval surgeon was to stand by when men were being flogged for misconduct to see that the punishment was not in excess of what they could endure. Prior to the ordeal the victim's shipmates generally helped to deaden his sensations as far as possible by filling him up with rum saved for the purpose from their daily allowance. Flogging in the Navy of the United States was abolished in 1850 owing, in part, to Commodore Levy's representations. U. P. Levy, commissioned a master October 23, 1812, appears to have been the Dreyfus of his period. Personal hostility and racial prejudice pursued him for 40 years, in the course of which he fought a duel, killing his opponent, was court-martialed six times, and finally dropped from the Navy list when a captain. This rank was restored to him in 1855 and he later became a commodore. A portrait of him in full uniform is to be seen at "Monticello," Albemarle County, Va.

THE FOUNDERS OF NAVAL HYGIENE.

James Lind (1716-1794) was a strenuous advocate of antiscorbutic measures, of distillation of water aboard ship, of routine reception and outfitting of recruits on special tenders before they were allowed to mingle with the crews of ships (adopted in 1781), of a uniform costume for enlisted men. He urged the value of disinfection, the use of quinine as a prophylactic against malaria, amelioration of the seaman's quarters, diet and general comfort and the importance of ventilation. He described a method of inducing respiration for the asphyxiated. He published a "Treatise on Scurvy" (1754), an "Essay on Preserving the Health of Seamen in the Royal Navy" (1757), and an "Essay on Diseases of Europeans in Hot Climates" (1768).

Thomas Trotter (1760-1832) was an ardent believer in vaccination and advocated its compulsory employment in the navy. He put fresh

air ahead of chemical disinfectants and urged the employment of mechanical devices for renewal of air between decks. He believed in providing amusement and entertainment for enlisted men. He had the courage openly to condemn impressment and other abuses and agitated for better treatment of naval medical men. In the second edition of his "*Medicina Nautica*" he complained bitterly of how the navy surgeon was discriminated against in the matter of pay and half pay. He recommended the establishment of a board of health to compel the adoption of necessary sanitary measures. Cleanliness, dry, well-aired bedding and dry decks, and exercise he considered essential to the health of seamen and he urged a liberal issue of soap. While a firm believer in the medicinal value of alcohol in moderation he boldly opposed intemperance and struggled to reform the abominable conditions favoring vice in English seaports. He opposed the practice of requiring sailors to pay for treatment for venereal disease (the usual charge was 15 shillings), outlined venereal prophylaxis and long before Ricord distinguished between gonorrhea and syphilis.

Gilbert Blane (1749-1834), a man of markedly scholarly attainments and high in the esteem of important officials of both army and navy, exercised a powerful influence in obtaining the reforms for which Lind and Trotter had fought in vain. His "*Observations on the Diseases of Seamen*" was published in 1785. He made careful experiments in the artificial preservation of foods, systematized the collection of medical data in the navy, and labored to advance the cause of preventive medicine. He insisted that in military organizations the health of the personnel must be the subject of systematic government concern and not left to the interest and discretion of individuals. He succeeded in having the medical supply table greatly increased, procured the issue of soap, and in 1804 brought about the regular assignment of a definite space in every ship for use as a sick bay. During his naval career the health of the British Navy was greatly improved. Thus, in 1782, when the personnel (seamen and marines) aggregated 100,000, the proportion of sick (transferred to hospital) to well men was 1 to 3.3. Thirty-one years later with a personnel of 140,000 the proportion of hospital cases was only 1 to 10.75.

In 1797 he visited officially the Russian fleet wintering in British ports. In 1809 he accompanied a commission sent to investigate the unusual prevalence of sickness among the troops on the island of Walcheren. His report was indorsed by the army doctors (though it was most unusual to have a civilian physician, and an ex-navy one at that, passing judgment in such matters) and favorably acted on by the Government. It was for this service that he was made a baronet.

In 1825 we find him writing to the East India Company, and in 1832 publishing a general warning about the nature of cholera and its mode of spread. His views were indorsed by the Royal College of Surgeons, but, through the force of public opinion to the contrary, an opposite stand was adopted by one of the local boards of health. Quarantine was relaxed, and soon after Great Britain was visited by a severe epidemic of cholera. One of the victims was Blane's own wife.

Lind was by no means the first to urge fruit juices for scurvy. Sir Richard Hawkins made use of them (1593), and so did Commodore Lancaster (1600). B. Ronseus in the Dutch fleet (1564) recommended fruits and vegetables of different kinds. Felix Plater (1608), Woodhall (1636), and Charles Bisset (1775) did likewise. Dr. J. Huxham recommended vegetables for the scorbutic cases in Admiral Martin's fleet (1747). Nor had the general subject of naval medicine been wholly neglected. Dr. William Gilbert, physician to Queen Elizabeth, famous for his book "*De Magnete*," urged the study of naval medicine, and proposed to write on the topic himself, but failed to do so for lack of time. He was reputed an expert in such matters, and was at the head of a committee of physicians appointed by the privy council to concert measures to arrest the prevalent diseases in "*Her Majesty's Navy*" and for the general health of the personnel. His contemporary, George Whetstone, gallant, poet, and traveler, wrote a treatise on "*The Curing of Hot Diseases Incident to Travelers in Long and Southern Voyages*." Woodhall wrote "*The Surgeon's Mate*" (1636); John Moyle (1686), "*Abstract of Sea Surgery*"; William Cockburn (1696), "*Sea Diseases*"; C. Bisset (1755), "*Treatise on Scurvy*"; P. Deperrrières (1767), "*Traité des Maladies des Gens de mer*."

[The United States Navy has contributed its full share to the development of this subject, beginning with W. P. C. Barton, first chief of the Bureau of Medicine and Surgery (1842). He wrote (1830) "*Hints for Naval Officers Cruising in the West Indies*" and (1814) at the request of the Secretary of the Navy, "*Marine Hospitals*." Barton strove to initiate many needed reforms, and his ideas for the improvement of the service were far ahead of his time. As chief of bureau he was fearless in his efforts to advance the standing and efficiency of the Medical Corps. The "*Naval Hygiene*," by Medical Inspector A. L. Gihon, U. S. N., had passed through three editions by 1873. Surgeon Delavan Bloodgood, U. S. N. (1873), wrote "*Yellow Fever Report*;" Medical Inspector E. Shippen, U. S. N. (1873), wrote "*Report on English Hospitals*;" Medical Inspector J. M. Browne, U. S. N., "*Hospitals, etc., and Peculiar Diseases of Peru*"; Medical Inspector R. C. Dean, U. S. N. (1876), wrote on "*Naval Medical Schools of France and England*"; Passed Assist. Surg. J. D. Gatewood, U. S. N. (1893), wrote "*Naval Hospitals and Medical Schools*." Gatewood's "*Naval Hygiene*" (1909) is a monumental and exhaustive work. Rear Admiral E. R. Stitt, Medical Corps, U. S. N. (1915), wrote "*Tropical Diseases*," and J. C. Pryor (1918) a concise manual of "*Naval Hygiene*."]

MEDICINE IN ARMIES OF THE 18TH CENTURY.

Sir John Pringle (1707-1782), who worked for the army with the same earnestness that Lind, Trotter, and Blane displayed in the cause of reform in the navy, enjoyed a rich experience of military surgery and was surgeon general of the English Army from

1742 to 1758. He was a friend of van Swieten, a pupil of Boerhaave. In his "Observations on the Diseases of the Army," published in 1752, he set forth the principles of military sanitation and emphasized the importance of ventilation in hospitals. He secured the erection of barrack hospitals in the field, suggested the term *influenza* for the disease now known by that name, established the identity of hospital and jail fevers, and anticipated the antiseptic idea. He prevailed on the Earl of Stair, about the time of the battle of Dettingen (1743)—the last in which British troops were led in person by their sovereign—to suggest to the Duke of Noailles that their respective hospitals be regarded as neutral.

Van Swieten published a monograph on camp diseases in 1758, Richard Brocklesly "Economical and Medical Observations on Military Hospitals and Camp Diseases" in 1764, H. Ravaton a "Chirurgie d'armée" in 1768, and Jean Colombier the "Code de Médecine Militaire" in 1772. In America Dr. John Jones, professor of surgery in King's College, New York, and a talented lithotomist—whom Benjamin Franklin remembered in his will—compiled from various English sources a book of "Plain, Concise, Practical Remarks on the Treatment of Wounds and Fractures," New York, 1775, with an appendix on camp and military hospitals which made it invaluable to the young medical officers of the Revolution.

But in spite of many studies and many books and the zeal and labor of individuals of great ability the actual care of the sick and wounded on land and sea was lamentably deficient. There were brilliant operators and clever physicians but their opportunities for usefulness were restricted, their efforts checkmated at every turn by the arrogance and indifference of leaders and the utter failure of governments to appreciate the need of medical organization.

John Hunter in dedicating his latest works to the King of England in 1792 used these words: "* * * these appointments gave me extensive opportunities of attending to gunshot wounds, of seeing the errors and defects in that branch of military surgery and of studying to remove them. It drew my attention to inflammation in general, and enabled me to make observations which have formed the basis of the present treatise." Hunter's military record is summarized as follows:

John Hunter, surgical staff, Great Britain, October 30th, 1760. Half pay, 1764. Full pay, assistant surgeon general January 4th, 1786. Surgeon general and inspector of regimental hospitals March 17th, 1790. Died October 1793. Belleisle, 1761. Portugal 1762.

Hunter's actual field service was limited to the Belleisle and Portuguese expeditions, but he made the most of them. Ten thousand English troops escorted by eight ships of the line were engaged in

the former. The chief town of the island had a garrison of 4,000 men under the Chevalier de Saint Croix.

Saint Croix, in order to deceive the British as to its numbers, mounted fifty volunteers on farm horses of the island, his efforts being admirably seconded by the female population. The women asked permission to help in this deception and formed a squadron clothed in red capes. Those who had no horses mounted cows." (Waddington's *La Guerre de Sept Ans.*)

A month of siege intervened between the first and second attacks. The British loss was 700 killed and wounded. After the capture Hunter remained for a year in the garrison. Many of the 450 French wounded probably passed into his care, in accordance with the treaty of capitulation " * * * for it was provided by Article XI of the capitulation that 'the officers and soldiers who are in hospital in the town and citadel shall be treated in the same manner as the garrison, and after their recovery shall be furnished with vessels to carry them to France.'" In response to appeals for financial assistance the Deputy Paymaster General was directed to turn over to John Hunter the sum of £200 for the use of the hospitals in Belleisle. In 1762 Hunter embarked for Portugal, which appealed for help against the Spanish invasion. The British force amounted to 7,000 men.

From the time of John Woodhall the pay of army surgeons and other features of their service had not been such as to attract good men. He says in his *Surgeon's Mate* (1639).

And for the surgeons in his Land service he (the King) allowed to the Surgeon-Major of the whole camp five shillings a day. Also his Majestie alloweth to each Surgeon two shillings and sixpence a day, which is three pounds and fifteen shillings a month, and to each Mate three pounds a month. * * * And further His Highness hath referred to the ancient Masters and Governors of our Society (i. e., the company of Barber-Surgeons) the pressing of all Surgeons and Surgeons' Mates or servants to Surgeons and Barbers.

There had been little improvement by Hunter's time. Robert Hamilton wrote in 1787:

Each regiment is allowed a Surgeon, as he is termed, and a Surgeon's Mate. Their business is to attend to the diseases of the men at all times whenever it is judged necessary. For this service the surgeon is allowed four shillings a day; the mate three and sixpence. But out of this are levied from them considerable duties; from the surgeon a shilling, and from the mate sixpence a day. This makes their subsistence equal, so that each is limited to a guinea a week, and on this they must subsist as well as they can.

One of the causes of the inefficiency of the English medical service was the custom of employing ignorant and unqualified men for nominal pay under the designation "surgeon's mate" and with a rank corresponding to that of the modern warrant officer.

In the campaigns of 1793-94 the English Army was rendered inefficient by mismanagement and neglect. Men were sent to the front

dressed in a linen jacket and trousers and provided with no other clothing. Some of the regiments were supplied with overcoats by public subscription. Medical affairs were on a par with this. Fortescue, in his "British Campaigns in Flanders," says in regard to matters in 1794:

But the very worst department of all was that of the hospitals wherein the abuses were so terrible that men hardly liked to speak of them. * * * Some kind of a medical staff was improvised out of drunken apothecaries, broken-down practitioners, and rogues of every description, who were provided under some cheap contract; the charges of respectable members of the profession being deemed exorbitant. * * * "The dreadful mismanagement of the hospitals is beyond description," wrote General Craig.

By November, 1794, out of 21,000 men 11,000 were sick. The expedition broke down as the result of combined ignorance and parsimony in all quarters.

George James Guthrie's grandfather served at the Battle of the Boyne; his uncle was a naval surgeon. At 13 he attracted the notice of Mr. Rush, inspector-general of army hospitals, who apprenticed him to a London surgeon. Following his examination before the college of surgeons, Guthrie was appointed to the 29th Regiment. He was then 16 years old. His colonel was 24. His first foreign service was in North America. On returning, in 1807, he was sent at once to the peninsula, where he served until 1814, earning the commendation of Wellington. He was, though only 26, the senior medical officer present at the Battle of Albuera, where he found himself one evening, with four wagons and such equipment as his regimental surgeons could carry on their persons, with 3,000 wounded to care for 7 miles from the nearest village.

Guthrie was in private practice in London on half pay when word was received of the Battle of Waterloo. He hastened to Brussels and operated on the wounded. One case involved an amputation at the hip and another the ligation of the peroneal artery. Returning to London he for two years looked out for the more serious surgical cases resulting from the war.

Guthrie has been called the "English Larrey," and he undoubtedly did more for military surgery in England than any man since Wiseman. H. A. L. Howell (*Brit. Jour. Surg.*, Vol. III, No. 9) thus summarizes his work: "Before his time it was usual to treat gunshot wounds of the thigh by placing the limb on its side. He introduced the straight splint. He differed from Hunter in the treatment of gunshot injuries requiring amputation, advocating primary amputation, whilst Hunter was in favour of secondary operation. After Albuera, he introduced the practice of tying both ends of a wounded artery at the seat of injury—also contrary to Hunter's teaching, for Hunter tied the artery above the injury. Guthrie's experience in the

field was certainly very much greater than Hunter's, and Guthrie's practice was soon accepted by the practical surgeons who had gained their experience in the peninsula. Guthrie advocated the destruction with mineral acids of the diseased tissues in cases of 'hospital gangrene.' His best known work is "A Treatise on Gunshot Wounds," published in 1815.

Guthrie's treatment of hospital gangrene by the application of sulphuric acid was a radical measure, but something far more radical was required. It was well enough, it was highly desirable, to cure individual cases of hospital gangrene, but what steps were taken to eradicate hospital gangrene from the nomenclature of prevalent diseases? Civil as well as military hospitals were places where patients went to die. In civil and military hospitals alike fresh infections were contracted. Thus the stigma already attaching to hospitals as partaking of the nature of eleemosynary institutions was intensified by the element of fear and the popular prejudice against them has survived until very recent date. The great need of the armies and navies of the eighteenth century was for men of large ideas who could conceive of their duty in larger terms. The medical officer who thinks of himself only in his relation to individual patients has not grasped the scope of his mission.

Germany, which in our time has produced military men like Es-march, Langenbeck, and Stromeyer, was in the eighteenth century very backward in its military provisions.

In the forces of the Duchy of Brandenburg, the nucleus of the later developed Kingdom of Prussia, there were regimental physicians and field barbers, each soldier contributing a stipulated amount monthly for their support. Prussia in 1705 had a standing army of 35 regiments, but only six of them had anything like an adequate number of regimental surgeons. In 1712 the supervision of company surgeons was transferred from the officers of the line to regimental surgeons. The first surgeon general was Conrad Holtzendorf, appointed in 1716. The year 1713 had seen a phenomenal advance in the standing of regimental surgeons, placing them *below the chaplain but above the drummers! They were still liable to be caned!* In 1758 Dr. Ellenberger, a "feldmedicus," received corporal punishment by order of his colonel. A certain general on his death-bed arranged for his attendants to get 50 blows apiece in case autopsy proved they had been wrong in their diagnosis. Company surgeons shaved the officers. They visited sick and wounded only to report their condition to regimental surgeons, not being allowed to treat patients except under direction. The distinction between surgeon and physician existed in full force, physicians being called in consultation as superior beings. But some provision was made for train-

ing the military surgeon and a certain number were sent to France to study. Frederick the Great employed 12 French surgeons "in order to always obtain better subjects for the military service." Salaries were small. The regimental surgeon had to assign a certain proportion of his pay to the company surgeon as well as keep the medicine chest stocked. Jews were not admitted as military physicians, partly from real hostility to them and partly in deference to the decree of the Council of Vienna (1267), which forbade a Jew to practice on a Christian. The French Revolution helped to do away with some of these restrictions, but the anti-Semitic feeling remains, as the famous Dreyfus case amply demonstrated. In some of the German States apothecaries were employed with troops, in others not. Saxony allowed its military medical men a uniform to distinguish them from common soldiers, but it also separated them conspicuously from officers. Nursing was done by women who marched with the troops. In Austria at the beginning of the Seven Years' War Protestant surgeons had to turn Catholic or leave the army. Lorenz Heister, of Frankfort on Main, who became a teacher in surgery, obstetrics, and ophthalmology and was the originator of the spinal brace, entered the Dutch military service to learn surgery rather than endure the humiliations incident to medical practice in the armies of Germany.

J. F. Frank (1745-1821), the eminent teacher of comparative anatomy, forensic medicine, and public sanitation, was made director of army medical affairs in Vienna after being in charge of sanitary administration in Lombardy.

The great trouble, of course, lay in the reputation for humble birth, lack of skill, rough methods, and downright ignorance, which descended to the surgeon from the barber, and in fact throughout the eighteenth century surgery was still largely done by the barber class, at any rate in Germany, save when individuals had the ability and enterprise to educate themselves and were able to rise above the common level. The stigma attached to early surgery was destined to survive in naval and military life long after it became a learned, a gentleman's, profession. But the ignorance of the average army surgeon finally led to definite steps being taken for his improvement and courses of instruction were provided in connection with the hospitals of Berlin, Dresden, and Vienna toward the close of the century. The school and hospital built by Peter the Great on the lines of the Greenwich Hospital burned down and was rebuilt, to pass in 1754 to the war administration. In 1799 was founded the Russian Army Medical Academy.

Flanders, the perennial seat of war, has contributed its full share to the development of military surgery. Surgery and anatomy was

taught in Bruges and at the military hospitals of Lille and Gravelines as early as the seventeenth century.

In France, after the Revolution, *écoles de santé* were created to train medical officers for the armies of the Republic. The schools of Paris, Strassburg, and Montpellier were centers of medico-military instruction. The École de Médecine Militaire of Val-de-Grâce was founded in 1796.

The first medical man to appreciate fully the value of combination, of concerted action between line and staff for the benefit of the wounded in action, was Jean Dominique Larrey. Napoleon Bonaparte held him in high esteem and lavished honors upon him. He said of Larrey: "He is the most virtuous, the most upright man that I have ever known." This is high testimony from the world's greatest soldier and from one who, whatever his faults, had the deepest insight into character and was able to appreciate the noblest qualities in men. Napoleon added:

In the most inclement weather and at all times of the night or day, Larrey was to be found among the wounded. He scarcely allowed a moment's repose to his assistants and kept them eternally at their posts. He tormented the generals and disturbed them out of their beds at night whenever he wanted accommodations or assistance for the wounded or sick. They were all afraid of him, as they knew he would instantly come and make a complaint to me. He paid court to none of them.

Larrey was a surgeon of superior ability and original mind, and many of his methods of wound treatment were revived in the World War. But his chief title to fame is his scheme (based in part on the ideas of P. F. Percy) for the handling of the wounded which he put into force. He introduced an effective method of recovering, transporting, and treating the wounded on a large scale. He put medical organization on a par with military organization and combined them. This had never been accomplished before. It would take too long to go into details, but the essence of the plan was to have medical units for each military unit. Every military division had its medical division. As one multiplied or increased so did the other; if the army, corps, or division was divided, reduced, or increased, so was the medical unit in proportion.

The administrative work of a division was handled in two sections. One was composed of a commissary and various subordinates, 12 mounted and 25 unmounted sick attendants, all soldiers, and a drummer. The other section consisted of 12 light carriages and 4 heavy vehicles, each with a man in charge, and a driver, a horseshoer, and a bugler. The personnel of the medical division numbered 113 persons. The division was formed of a number of subdivisions each with a directing surgeon and 15 subordinate surgeons of various ranks. The light vehicles drawn by one horse, or two if the terrain

was difficult, were on springs, "easy running, furnished with mattresses, padded sides, and pockets for supplies." They collected the wounded and evacuated them to the heavy wagons which bore them to the principal dressing station or to the hospital beyond the battle area. The serious cases were attended to where they fell, and emergency surgery was done under fire. Larrey's scheme was put to the test for the first time during the operations before Metz (the scene of worthy endeavors by Guise and Paré) in 1793 and gave such general satisfaction that he was ordered to assemble the necessary ambulance units for all the 14 armies of the Republic.

It is a fact of great significance that after the Battle of Toulouse 98 out of 1,407 wounded British troops lost a limb by amputation, or about 1 in 15 patients! It was not only that joint injuries led to amputation, that hemorrhage and infection were serious, and likely complications. The details of hospital care, transportation, nursing, and feeding were still matters of minor consideration. The English and French surgeons of the Napoleonic era acquired wonderful skill as operators. Their technique was brilliant and they only required seconds for what to-day we do in minutes, lulled to deliberateness by the blessing of anesthesia; but the rapid and effective amputation was the best that military surgery had to offer, and a limb was the price of life.

The world was far from even apprehending what it has yet to learn thoroughly, that in the field the distribution of medical supplies, prompt evacuation, skillful first aid, shelter, food, and restoratives available early for every fallen combatant are of infinitely more importance than highly technical relief to difficult cases. More critical still are the problems relating to later demobilization, to hospitalization and rehabilitation of war victims, and the faithful but well-ordered and economical relief of the wreckage of war. Millions will be spent and more millions wasted until the time comes when it is a recognized part of the program of national defense to organize methods of post bellum relief at the same time that activities are initiated for the prosecution of hostilities. We have progressed from the day of medical attendance for leaders to medical attendance for all combatants, and leaders are increasingly alive to the immediate necessary needs of their forces; but we have not yet attained to a comprehensive grasp of the requirements or possibilities of military medicine. Governments, medical men, the public at large still have an attitude comparable to that of some commander in chief who drills companies, or occupies himself exclusively with the evolutions of the ship on which he himself is embarked when he should be occupied with massing forces at strategic positions or directing the movements of fleets. The World War awakened au-

thorities to conceptions of a greater military efficiency through coordination of units, and a beginning was made in those larger combinations essential to success. The differences of language, of requirements, of duties in the allied forces made special measures necessary to coordinate effort, and eventually a supreme command unified and strengthened the offensive movements. The word *liaison* acquired a new and vast significance in an international sense. The *liaison* idea must be more fully and heartily extended into every ramification of military enterprise. Japan in its war with Russia anticipated this idea of the coequal importance of all the features that contribute to produce the healthy, well-trained fighting man, and then to keep him at the front; to restore him to duty after wound or injury at the first possible moment. This involved a degree of attention to sanitary procedure and a recognition of the medical officer never before realized in practice.

THE REVOLUTIONARY WAR.

There are innumerable occasions when it would be both useful and pertinent to quote from the history of the Medical Corps of the Navy, but the mortifying confession has to be made that the data have never been collected. The more fortunate members of the Medical Corps of the Army appear not only to have an inclination for the cultural aspects of life, but to be able to obtain from superior authority the time and the favorable conditions necessary for gathering up scattered fragments of history and arranging them not as a mere feat of scholarship but for the practical purpose of using them to illumine existing problems. Happily, too, publishers of liberal and patriotic spirit are still to be found willing to consider the ultimate usefulness of a book regardless of the question of ready sales.

Colonel W. O. Owen, U. S. Army, begins his "History of the Medical Department of the U. S. Army, 1776-1786" with these words:

So far as I have been able to acquire it, the original method of caring for the sick and wounded in the Revolutionary War, which is the beginning of our medical history, was to employ individual medical men wherever they might be found to take care of the sick or wounded who happened to fall in some particular fight in their locality.

Little by little the generals in command, the Provincial Congresses of the colonies, and the Continental Congress of the United Colonies had medical matters forced upon their attention by the numerous bills coming in from doctors, here, there, and everywhere that there had been a battle.

Viewed as a whole, the medical affairs of the Colonial forces during the Revolution were in a state of disorder and provision for sick and wounded was desultory and inadequate. Our armies were hastily

organized and equipped, and fed and financed with the greatest difficulty, as was to be expected under the circumstances, for the very Government of the revolted colonies had to be organized. But even the Continental Congress showed itself far too little concerned with medical matters and the record of its deliberations proves that legislation for the medical department was constantly deferred in favor of enactments considered more important. Official discrimination against the medical department marked the very beginning of the Republic. It was largely through the indefatigable efforts of the persevering and pertinacious John Morgan, successor of Benjamin Church, first surgeon general, that money for stores and supplies was obtained. It was as the result of determined, pointed, and angry representations from the Army surgeons of the Eastern Division, and more particularly of the Massachusetts surgeons, that something was done to make their status what it should be. They memorialized Congress for redress of wrongs and "required that in a limited time" some action be taken! They threatened to resign by a certain date if justice could not be obtained. They were advised to apply to the State of Massachusetts. Dr. John Warren prepared for them a petition to the governor of that State. The authorities then invoked received the petition favorably and eventually Congress awarded to the medical officer those benefits of pay, pension, and bounty which it had previously found time to prescribe for the line officers.

It was fortunate for the country, for the Army, that Gen. George Washington, while bearing huge responsibilities and beset by incalculable difficulties, found time for attending to the medical and sanitary requirements of troops, apparently deeming them an integral part of the duties of military command. He seconded the professional efforts of the medical men and showed them every courtesy and consideration, while at the same time insisting on a strict performance of duty by them. He was a firm believer in inoculation against smallpox, and while encamped in New Jersey (1776) had hospitals fitted up for the purpose. He further ordered Shippen "to inoculate the recruits as fast as they come to Philadelphia." This was in marked contrast to the attitude of Gen. Thomas, in command of a division of the Northern Army, who forbade inoculation as taking too much time, contracted the disease himself, and (June 2, 1776) died of it!

When some definite attempt at organizing medical administration was first made the designation "hospital" was used instead of medical department. On July 21, 1776, Washington wrote thus to Congress:

I have made inquiry into the establishment of the hospital and find it in a very unsettled condition. There is no principal director, or any subordination

among the surgeons; of consequence, disputes and contention have arisen, and must continue until it is reduced to some system. I could wish it were immediately taken into consideration, as the lives and health of both officers and men so much depend upon due regulation of this department. I have been particularly attentive to the least symptoms of the smallpox; and hitherto we have been so fortunate as to have every person removed so soon as not only to prevent any communication, but alarm or apprehension it might give in the camp. We shall continue the utmost vigilance against *this most dangerous enemy*. (Italics ours.)

On September 24, 1776, he again addressed Congress to call attention to the serious irregularities, infractions of discipline, mutual recrimination, and neglect that characterized many of the surgeons.

In short there is a constant bickering among them which tends greatly to the injury of the sick, and will always subsist till the regimental surgeons are made to look up to the Director-General of the hospital as a superior.

The following letter attests his broad and generous spirit and his sense of right.

HEADQUARTERS, VALLEY FORGE,
13th of Jan. 1778.

DEAR SIR: Since writing to you this morning on the subject of the prize Brig. *Symetry*, the Regulations of the Field Officers of the Division for conducting the Sale and disposing of the cargo was laid before me with a letter from the Regimental Surgeons and Mates to Doctr. Cochran. These Gentlemen feel themselves so much hurt by the discrimination made by these Regulations between them and the officers of the division that they have sent in their Resignations.

As the common Guardian of the rights of every Man in this Army I am constrained to interfere in this matter and to say that by these regulations a manifest injury is intended not only to the Gentlemen in the medical line, but to the whole Staff, who, supposing the prize should be adjudged the sole property of the Captors (a matter in my opinion not easily to be reconciled on principles of equity and Reason), have as good a right to become purchasers in the first instance and to all other privileges, as any Officers in the Division.

For these Reasons therefore I desire that you will not proceed to a Sale or distribution of any of the Articles, except in Vessels, till you have my further directions, and that you will as early as possible transmit me an inventory of the Baggage and Stores.

The letter to Congress is nevertheless to go on, and you will please to forward it by the first conveyance.

I am, dear Sir,
Yr. most obt. Servt.,

(Signed) G. WASHINGTON.

General SMALLWOOD.

When hostilities first broke out in Boston, confusion prevailed. The Provincial Congress of Massachusetts Bay, on April 27, 1775, appointed "Capt. Kingsbury, Doctr. Hullen, and Deacon Stone" a committee to "inquire and endeavor to get an exact account of the men killed and wounded, and murdered, in the late scene on the 19th instant." Massachusetts was most enterprising throughout the whole

struggle and, by May 8, steps were taken to provide medical personnel and examining boards to determine fitness for appointment to the position of regimental surgeon. By October, as we learn from a letter written by Dr. John Warren to John Hancock, there were in operation in Cambridge four hospitals for soldiers, the "Washington," the "Putnam," the "Lee," and the "Convalescent Hospital," with a total of 350 patients. Three hospitals, similarly converted from private houses, were established in Roxbury. Warren refers to the uncertainty about what measures to take and whose authority to recognize (Benjamin Church, the Surgeon General, was under arrest for treason), laments the difficulty in obtaining medicines, and suggests that as importation of Peruvian bark may become increasingly difficult willow bark might be used as a substitute. He concludes: "If your honor can attend to the care of transmitting the regulations for the hospitals to us at Cambridge *speedily*, it will greatly conduce to the benefit of the public."

Already a smallpox hospital had been opened in Boston, and the care of the insane of the Army had become a question of importance. Committees were appointed to purchase stores and to attend to the care and disposal of sick and wounded. The Provincial Congress issued regular communications worded as follows:

The Congress of the Massachusetts Bay, to A. B., greeting:

Being informed of your skill in surgery, and reposing especial trust and confidence in your ability and good conduct, we do, by these presents, constitute and appoint you the said A. B., to be surgeon of the regiment of foot, whereof ——— is colonel, raised by the Congress aforesaid, for the defence of said colony. You are, therefore, carefully and diligently to discharge the duty of a surgeon to the said regiment, in all things appertaining thereunto, observing such orders and instructions as you shall, from time to time, receive from the colonel of said regiment, according to military rules and discipline established by said Congress, or any of your superior officers, for which this shall be your sufficient warrant.

By order of the Congress,

———, *President.*

Dated at Watertown.

It does not seem unfair to offer in partial explanation of the zeal and activity of the Provincial Congress of Massachusetts Bay the fact that *22 of its members belonged to the medical profession*. Some of the States took very little interest in medical preparations.

On July 27, 1775, Congress established under the name of "hospital" a Medical Department for an Army of 20,000 men, with the following personnel:

One Director general and chief physician, his pay per day, 4 dollars.
 Four surgeons, per diem each, one and one third of a dollar.
 One apothecary, one and one third of a dollar.
 Twenty (surgeons') mates, each, two thirds of a dollar.
 One clerk, two thirds of a dollar.

Two storekeepers, each four dollars per month.

One nurse to every 10 sick, one fifteenth of a dollar per day, or 2 dollars per month.

Labourers occasionally.

The duty of the above officers: viz.:

Director to furnish medicines, Bedding and all other necessaries, to pay for the same, superintend the whole, and make his report to, and receive orders from the commander in chief.

Surgeon, apothecary and mates. To visit and attend the sick, and the mates to obey apothecary and the order of the physicians, surgeons and apothecary.

Matron: To superintend the nurses, bedding, etc.

Nurses: To attend the sick, and obey the matron's orders.

Clerk: To keep accounts for the director and storekeepers.

Storekeeper: To receive and deliver the bedding and other necessaries by order of the director. * * *

The Congress then proceeded to the choice of officers for the Hospital, when,

Benjamin Church was unanimously elected as director of, and chief physician in, the hospital.

Resolved, That the appointment of the four surgeons and the Apothecary be left to Doct^r. Church.

That the Mates be appointed by the Surgeons;

That the number do not exceed twenty.

Later, three divisions were created—Northern Department, Middle Department, South Department—with a Surgeon General and Physician General at the head of each, and hospitals were provided in various States. From start to finish there was mismanagement, shortage of money, supplies, food, and instruments. Documents abound which tell of the wretched condition of the American troops and the Journal of Congress proves their correctness. Four days before the battle of Long Island (August, 1776) Morgan was able to supply for the hospital at Long Island only 500 bandages, 12 fracture boxes, and 2 scalpels, with the suggestion that razors be used to amputate with. During the winter of 1777, at Valley Forge, 2,898 men in the camp were physically unfit for duty. In 1778 Dr. J. Warren wrote to the Governor of Massachusetts regarding the Boston hospital, where he was senior surgeon, that there had been scarcely any available drugs there for a year, no vegetables for a week, no fuel except what could be gotten by stealing fence rails in the vicinity; that the only dependable food supply was bread.

In Pennsylvania and perhaps elsewhere there were insistent objections on the part of local communities whenever it was proposed to establish hospitals for the sick in their midst. Washington handled the situation with diplomacy, consideration, and firmness.

In May, 1780, Washington wrote to the Governor of Rhode Island, requesting that official's kind offices for Dr. Craik who was assigned

the duty of making hospital preparations for the sick in the French fleet then due. Craik proposed to use for this purpose the college buildings in the town of Providence. The citizens objected and other buildings were chosen.

The doctor will consult with your excellency about the houses which will be necessary and proper upon the occasion, and on the best mode of obtaining the refreshments which he may think it necessary to provide. He will stand very materially in need of your good offices in this interesting business, and in a particular manner will want the assistance of the State, either to advance him money or their credit, for laying in the requisite supplies. This I am persuaded they will most readily give him, from an earnest desire to afford every possible comfort and accommodation to the sick of our good and great ally, who have the strongest claim to our attention and generosity. Your excellence will be pleased to have the account of disbursements incurred on the occasion kept in a clear and particular manner, which will be punctually paid by Mons. Carne, commissary at war to his most Christian majesty; or Mr. Damour, his consul, in gold or silver, or in bills of exchange on France, on the arrival at Providence. One of these gentlemen will be there in a short time.

(The buildings of William and Mary College, Williamsburg, Va., were converted into a hospital without difficulty.)

It is interesting to note that in January, 1776, it was proposed to Gen. Carleton that when, by reason of military operations, hospitals changed hands, the inmates should be treated as friends and neither they, the surgeons, nor the other attendants on the sick be treated as prisoners.

It would appear that the best men in the country entertained liberal views on the subject of medical service to troops; that the leading medical men threw themselves heartily into the work; that many wise and fully adequate measures were suggested to Congress. On the other hand, jealousy, indifference, ignorance, and negligence characterized many officers of the Army; many of the medical men employed were incompetent; Congress was parsimonious and dilatory. Some of the best recommendations made to that body were considered, referred to a later day, considered again, again laid aside and never acted on. But money was scarce and there was weakness through division and personal animosity in everything attempted. Authority was divided. The patriotism which made men willing to die for a principle did not enable them to be subordinate. Discipline was uncertain and weak. Hence the best plans miscarried. Things were ordered purchased, but there was no money. People were directed to do things, but there was no one to compel them to do them. Thus, while both the knowledge and the disposition for adequate medical organization existed, disorganization was the rule and the American Army was in some sense in the predicament of all those earlier armies before it which depended for medical service on the whims of individuals. To the uprightness, the patience, the

kindliness, the fairness, the firmness, and the tact, as well as the comprehensive genius of Washington, was due the success of the Revolution.

THE CIVIL WAR.

When the Civil War broke out in America the Federal Government tried to take steps for the proper care of sick and wounded and the lessons of the Crimean War were not altogether ignored, but there was no realization of how long and terrible the struggle was to be. The Federal troops entered the war without hospitals and without ambulances, equipment, or personnel for handling the wounded in battle, nor was there any formulated plan about these things. Doubtless it had been generally agreed after the Mexican war that there would be no more war, though only 50 years had gone by since the close of the world war started by Napoleon; though Turkey and Russia had been in conflict in 1828 and 1829; though a sanguinary war, participated in by five nations, had ended but five years before in the Crimea; though, from 1848 on, there had been almost continuous agitation and armed conflict to eject the foreigner and make Italy "safe for democracy."

Ambulances and field hospitals such as Larrey utilized in Napoleon's time were not in use—they had never been officially adopted by us. Twenty wagons were expected to transport the entire medical stores of Gen. McDowell's army of 35,000 men when he marched out to fight at Bull Run! As a sample of the unpreparedness in this body of men may be cited a regiment of 700 Connecticut volunteers which possessed one ambulance and two hospital tents, but no litters, no medical or surgical supplies, and only members of the band available to help care for those who fell. Two very important things were made clear at the battle of Bull Run: First, that an aggregation of patriotic men willing to fight does not make an army; second, that well-meaning, kind-hearted, and professionally skillful civilian physicians are not necessarily competent medical officers.

At first the most crying need was for doctors. The Regular Army in 1860 boasted 30 surgeons and 83 assistant surgeons. Of this number 24 resigned later to go with the South and 3 were dismissed as disloyal. A new Surgeon General was appointed from the grade of assistant surgeon, the lowest grade, a man of strong personality and tremendous initiative who went to work heart and soul at the task of organizing an adequate Medical Department. His early successes were remarkable, and though at last he was court-martialed and ruined, owing to his differences with a capable but despotic Secretary of War, humanity was his debtor for the vast good he accomplished while in office.

William A. Hammond was not afraid to attempt big things for the sick. He spent in one year for ice alone more than the entire Army Medical Service cost the Government during a year of peace! By the end of the year 1861 he had secured the services of over 2,000 regimental surgeons, 3,600 assistant surgeons, and 5,500 acting assistant surgeons, the latter serving in the great base hospitals scattered throughout the country and including men destined to be leaders of the medical profession, such as Da Costa, Agnew, Stillé, and Keen.

The first hospitals of the Civil War were converted barns, churches, schools, factories, and private homes, the very type of buildings utilized during the American Revolution. The next step, as the needs rapidly increased, was to employ barracks, a most unsatisfactory plan. Then hospitals were built, first of one kind, then of another, until a type was evolved which may be summarized as the one-story, pavilion-ward hospital, with connecting covered ways and a central administration building. It is practically the model used by all armies to-day. These hospitals ranged in capacity from 1,000 to 3,500 beds. At the close of the war the Federal Government had 190 institutions of this kind, with a total bed capacity of 120,000, and they came to be administered with wonderful economy and efficiency. The ration was so liberal that money could be saved by commuting to cash, which was expended on luxuries for the patients. Empty flour barrels, fat, bones, coffee grounds, and used tea leaves were sold to the highest bidder. Even eggshells were saved and brought in a considerable sum, for eggshells are almost pure carbonate of lime, the basis of most face powders, and ladies must have their face powder even when the country is at war! A little matter of \$80,000 from these various savings was unused and on hand at the close of the Civil War and was devoted to founding the Surgeon General's Library at Washington, now the second largest medical library in the world.¹

It is not generally known, but it is a fact, that women were officially employed as nurses in our Army hospitals in the sixties. In a single institution in Baltimore 20 of the 70 nurses were women. In another there were 15 women among 70 attendants. In some hospitals there were from 40 to 60 Sisters of Charity. The germ of the idea so fully developed in our day that entertainment and recreation must be provided for the sick is shown by the use of so-called "slush funds," which ran as high as \$400 a month in some hospitals and permitted the purchase of books, musical instruments, printing presses, and the employment of lecturers and professional entertainers. A special feature of the Civil War hospitals was the employment of under-

¹ The Medical Department in the Civil War, by S. Weir Mitchell. Jour. Am. Med. Assn., May 9, 1914.

graduate medical students, called "medical cadets," who acted as clerks and did surgical dressings under the direction of the regular surgeons.

(The notes immediately following are derived mainly from a very interesting, scholarly, and detailed monograph by Capt. L. C. Duncan, Medical Corps, U. S. Army, entitled "The Medical Department of the United States Army in the Civil War.")

Surgeon Thomas McParlin, a man of considerable ability, was medical director of the army operating in Virginia at the beginning of the war. He inclined too much to centralization, a method peculiarly inappropriate for forces suffering consecutive defeats and therefore requiring provision for small units. When, later, he succeeded Letterman in the Army of the Potomac his conduct of medical affairs was admirable.

Surgeon Jonathan Letterman was a power for good in the Army of the Potomac from the moment of his appointment as its medical director, July, 1862. His splendid services have never been accorded the recognition they deserve from either the medical profession or the country at large. After the battle of Gaines Mills the Federal forces withdrew in the night, leaving 2,500 seriously wounded men to an enemy unprovided with resources for its own casualties. Under Letterman's administration this sort of thing did not occur again. At the time of his appointment one-fourth of the army to which he was attached was in hospitals largely destitute of supplies. The whole Medical Department needed reorganizing. His first act was to ask the Surgeon General for 200 ambulances and 1,000 hospital tents. By August 15 he had accomplished the evacuation of 20,000 sick and wounded. He had arrived at the scene of operations with a businesslike scheme, worked out in every detail, for an efficient ambulance service. The businesslike McClellan appreciated its value, and it was put into effect on August 2, less than a month after Letterman reported for duty. Fortunately the plan had not been sent to Washington to be lost or suppressed by the bureaucrats. It provided for ambulance service on the basis of army corps. The ambulance service for an army corps was commanded by a captain having under him a first lieutenant for each division, a second lieutenant for each brigade, a sergeant for each regiment. These officers were detailed from the line, but were under the control of the medical directors. This provision for personnel worked harmoniously and there was none of the friction that might have been predicated about it in advance. The one real objection to it was that the ambulance personnel could not give medical assistance. In all other respects the arrangement was ideal except that there was no provision for a reserve. The detail of captains, lieutenants, etc., was usually from

the Quartermaster Department. Letterman's idea in this was to relieve the medical officer, especially on the battle field, of having to be concerned with nonmedical things, such as harness, vehicles, horses, etc. It is interesting to note that suggestions for organization looking to improvement of ambulances and medical service made to the Secretary of War by W. A. Hammond were unqualifiedly condemned by Gen. Halleck, then military adviser to the President. Fortunately under McClellan the principal provisions had already been enacted.

The surgeon in chief of a division detailed two medical officers and two hospital stewards for the division ambulance service on the march. No ambulance service was furnished or permitted except on an order from the senior regimental medical officer. In camp all details of parking, roll call, stable, and police duty for the ambulance service were regulated by the line officers. The ambulances were assigned to corps on the basis of 3 to a regiment of 500 men. Two army wagons were assigned to each division train of about 30 ambulances. The Fifth Corps at Gettysburg had 81 ambulances for 12,509 men engaged, or about 1 to 150.

Letterman's next step was the preparation of supply tables, with specific allowances for definite periods and units, with a view to stopping the great wastage and consequent shortage of stores then prevailing. His third measure was to facilitate the treatment of the wounded in the field and to obviate on the battle field that confusion most liable to occur and most disastrous there. Backed by the necessary authority he issued a circular to his subordinates outlining his plan for field hospitals and put it into effect at once. He practically abolished the regimental hospital and substituted for it the division hospital. The ambulance system, the supply system, and the division hospital received their first severe trial at Fredericksburg on December 13, 1862, and stood the test well. Though defeated, the army handled its 10,000 wounded satisfactorily. All were brought in within 12 hours. Twelve days later they had been safely evacuated to Washington. The field hospital had certain defects—mobilization only for an engagement, insufficient personnel, poorly kept records, use of supplies and tentage largely from the brigades, officers of other organizations. Under McParlin many of these defects were remedied and ambulance and field hospital reached a high state of efficiency by 1864.

The great scourges of both armies in the Civil War were typhoid fever, dysentery, erysipelas, pneumonia, and, worst of all perhaps, hospital gangrene, the most fatal infection that attacked wounds. The "coutie," of which we have lately heard so much, was present.

It was commonly spoken of in the Northern armies as the "gray-back," which was a harmless but highly relished hit at the enemy, whose uniform was gray. Antisepsis and asepsis were unknown. Wounds suppurated and men died of blood poisoning just as was the case a thousand years before the discovery of America. This meant that to save life, wounded arms and legs had to be amputated. There was a special hospital in Philadelphia for amputation cases.

When the labors of Louis Pasteur in France and Sir Joseph Lister in England resulted in the evolution of antiseptic and aseptic surgery, the medical world felt that amputations because of infected wounds would never again be a prominent feature of war surgery. In this we were cruelly deceived, and we see daily among the brave men who have come back from the battle fields of France many a hero on crutches or wearing an empty sleeve. The new style of warfare involving weeks and months of continuous life in the trenches and constant occasion for digging into the earth for cover during the frightful artillery duels led to infections more sure and deadly than anything previously known, because the soil of France and Belgium has been heavily fertilized for centuries and teems with bacteria of terrible power for harm. It was the ever-present and fatal gas bacillus that made immediate amputation necessary. The bacillus of lockjaw was equally dangerous until it became the universal practice to administer protective doses of anti-tetanus serum to every wounded man.

MEDICAL STATISTICS OF WAR.

Statistics of disease and casualties in battle were not carefully collected until the nineteenth century, but a remarkable instance of losses from disease is furnished by the army which William of Orange took to Ireland to fight James II. His total regular troops numbered 14,000; of these 6,300 died of disease—nearly one-half. Some of the regiments were reduced from 700 or 800 to 60 men fit for duty. In the British expedition against Antwerp in 1809 disease was almost as fatal. The troops numbered 42,000. In six months 5,000 of them—more than 10 per cent—were sick in hospitals. As a result the prime object of the campaign had to be abandoned. The bulk of the army was shipped back to England, and of the 16,000 who remained 7,000 were sick. The total deaths for the expedition were 8,000, while only 106 were killed in battle; only 100 died of wounds.

This expedition—known as the Walcheren Expedition—was a complete fiasco from the simple fact that the most elementary sanitary considerations had been entirely neglected. The commander, the Earl of Chatham, established himself with the largest force

that had ever left England up to that time, a force well outfitted and capable, on a low-lying, flat, swampy terrain without proper supply of drinking water. The native Dutch on the island had a high mortality. Dutch troops had been decimated there by disease three years before. Two years before, four battalions of British troops had landed there and four-fifths of the men had promptly been taken sick. These significant facts received no attention except from the enemy. They were well known to Napoleon, who rejoiced in the blunder. *The sanitary error was a military mistake.* He had only to keep the British in check in the area they had selected to see the enterprise fail. I do not know if in advance the medical men of the expedition offered any advice to Chatham on the subject of Walcheren as a camp site. It is extremely unlikely. The day of consulting with the noncombatant is having a slow dawn, but the day will come when the commander who is above concerning himself with what men shall eat and how they are to be clothed and is satisfied to lose troops unnecessarily from disease will be held as guilty as if he had neglected any other vital detail making for victory. The Walcheren Expedition was a consummate failure through pride, stupidity, or ignorance, or from all combined; cowardice could scarcely have been more costly.

The effects of disease in military enterprises were strikingly illustrated by Napoleon's own attempt in 1802 to conquer Santo Domingo. Of 20,000 excellent troops sent out under Gen. Le Clerc, about 15,000 perished. The cause of death was mainly yellow fever, and no satisfactory methods of prevention were known at the time.

During the Napoleonic Wars, France developed brilliant amputators. Great Britain had men in its armies with some idea of the importance of sanitation. Sir James McGrigor, at the head of medical affairs for the armies in the Peninsula, had learned the lesson of Walcheren and labored to improve army hospitals. He began collecting accurate medical statistics, the point of departure for determining the causes of mortality and indirectly of diseases themselves. In two and a half years, 1808-11, the British in the Peninsula lost in hospital 2,699 from wounds and 14,269 from disease. The annual death rate from disease was 118 per 1,000, as compared with an army death rate at home of 15 per 1,000 per annum.

In the Mexican War we had on an average 100,500 men in the field. The losses were 1,550 killed or dead of wounds and 10,900 from disease. The discharges for disability were 12,280. The sick averaged from 17 to 27 per cent of the army.

The Crimean War furnishes at once a startling picture of the horrors consequent upon neglect and mismanagement and of the remarkable results for health obtainable by thoroughgoing, concerted attention to hygiene and sanitation. The British Army

which went to the Crimea in 1854 to fight Russia was unsurpassed in courage and physical fitness, and the nation was heart and soul behind it. Unfortunately those in authority had given little thought to health concerns. These were not regarded as essential features of a successful military project. The men's food, clothing, and quarters were inadequate. Roads should have been built from wharves to camps, storehouses should have been put up, sanitary measures instituted, including special attention to the drinking water and the housing of troops. Fuel and fresh provisions should have been obtained in part on the spot. None of these things were done. The inevitable happened. Cholera, dysentery, and scurvy broke out, and the men died by the thousand. The war involved 16,000 deaths from diseases and only 4,000 from wounds in battle. Each year of the war an average of 3 men in every 10 perished. For a time there were more men in hospitals than on active duty in the field, and the hospitals were conspicuous for the absence of every accessory contributing to recovery. The doctors were capable and devoted, but the system of administration rendered their efforts almost useless. When the British public learned through W. H. Russell, the reporter for the London Times, the true facts about the campaign, popular indignation passed all bounds. The ministry fell, and the new directors of affairs were forced to take steps to correct existing evils. Commissioners were dispatched to the scene armed with full authority to institute radical reforms. The results were striking. During the first winter of the campaign 63 men in every 1,000 died of disease, whereas during the second winter the mortality was only $3\frac{1}{2}$ in a 1,000.

It was at this time that Florence Nightingale became known to the world. She was a woman of genius and combined absolute fearlessness, energy, and determination, with gentleness, tact, and expert knowledge. The average person thinks of Florence Nightingale as the woman who developed the profession of trained nurse. She did far more than this. She foreshadowed the Red Cross idea. The unspeakably filthy, insanitary hospitals of Scutari, without adequate nursing force or proper food, were brought up to a high standard of efficiency by her tireless and devoted exertions, but this was not all. She was everywhere, tireless, patient, sympathetic. She comforted and encouraged the sick in countless ways. She wrote letters for the sick or coaxed them to write themselves. She established money-order post offices at the front so that soldiers might send home part of their pay. There were hundreds of women in the Crimea, wives of noncommissioned officers, enduring want and suffering, for whom the military authorities had no concern. She put them in the way of earning money in the hospital laundries and arranged for their subsistence in decency and comfort. She established cafés and

provided decent recreation as a counter attraction to the canteens where the soldiers sought forgetfulness of their hardships in drink. She even went so far as to urge the establishment of a medical school where the special medical features of army service could be studied on the spot. And after the war was over Florence Nightingale went back to England to work for the amelioration of the enlisted man's life in barracks in times of peace. All her work was on a small scale compared to what has been done recently on similar lines, but the glorious things accomplished for America and the world by the Red Cross are only an elaboration of her far-reaching plans.

The total average strength of the Federal armies during the Civil War was 806,755. The total deaths were 359,528. Of these, 67,058 were killed in battle and 43,012 died of wounds, or about 33 per 1,000 per annum. The deaths from disease were estimated at 224,586, or 65 per 1,000 per annum. Of 6,000,000 cases of sickness 200,000 were fatal, 3.4 per cent. There were 24,877 deaths due to accidents, injuries, and unknown causes. The discharges for disability were 250,000, the desertions 200,000. A very interesting detail is the difference in disease mortality for types of soldier and for race. The death rate in regular troops was 32, in white volunteers 55, and in Negro troops 133 per 1,000 annually.

"In the Navy, out of an average strength of about 60,000, 1,804 were killed or died of wounds and 2,627 died of disease. The rates are 7.5 and 11, as compared with 30 and 60 in the Army. The death rate from disease was no greater than in time of peace."¹

Both the Army and Navy operated hospital ships during the Civil War. We have reproduced a photograph taken by Dr. G. H. Bixby, April 22, 1864, of the *Red Rover*, a Navy hospital ship. (I am informed by W. S. Gibson, chief clerk, Bureau Medicine and Surgery, that this vessel was commanded by a medical officer.)

During the brief Spanish-American War we had few losses from wounds, but a serious loss of life from typhoid fever—more than 20,000 cases and 1,580 deaths in an army of 200,000 men. Of deaths from disease 85 per cent were due to typhoid fever. Had it not been for typhoid fever the losses in 1898 would have exceeded only by a little the average for peace times. This epidemic was a very real calamity and represented a backward step in military sanitation. Up to the Franco-Prussian War in 1870 loss from disease always exceeded loss from wounds. The ratio of battle death rate to disease rate was 5 to 1 for the French and 3 to 1 for the English in the Crimean War; 7 to 1 in our Mexican War, and 5 to 1 in our Spanish War. But in the Franco-Prussian War the Germans reversed the figures through the improvement of sanitary conditions which they obtained

¹ L. C. Duncan, loc. cit.

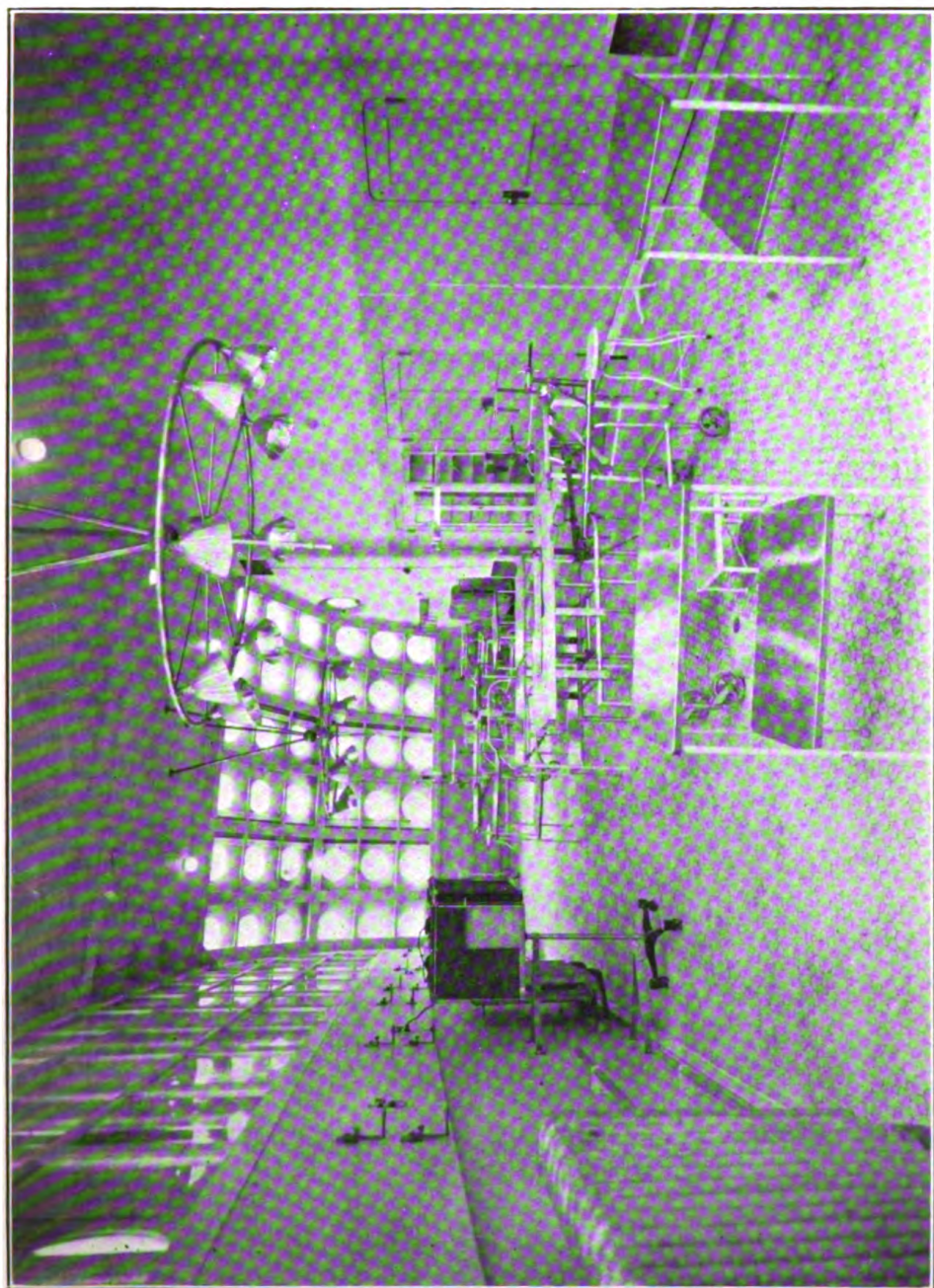
and lost only 1 man from disease to every 2 from bullets. The French, on the other hand, had about the ratio of our Civil War, 2 deaths from disease to 1 for wounds, owing doubtless to the great difficulty of taking the necessary measures in a campaign of continuous defeat and rout and more still to the fact that the medical department did not have the recognition and authority indispensable to success. In the Russo-Japanese War both sides lost more men from battle casualties than from disease. This demonstrated scientific progress in the handling of men and a reduction in useless sacrifice of life. The toll of life from typhoid fever would have been appalling in the World War, in view of the conditions under which the huge contending armies operated, had it not been for the general employment of vaccination against the disease—one of the sanitary marvels of our period. There were during the war and up to May 1, 1919, 227 deaths from typhoid fever in our armies.

The improved ratio of deaths from wounds to deaths from disease holds for our troops in the World War. The death rate per 1,000 troops per annum for the total forces under arms, both in the United States and France from the beginning of the war to May 1, 1919, was 13 for battle and 15 for disease. The number of men in the United States Army who actually reached France was 2,084,000; of these 1,390,000 saw active service at the front. The total deaths in the Army, including marines, from the declaration of war to July 1, 1919, were 115,660. Two-thirds of the deaths occurred overseas. The number lost at sea was 780, of whom 381 are included under battle losses, being due to submarine activity. We had in the American Expeditionary Force some 35,560 officers and men killed in action and some 14,720 who died of wounds, a total of 50,280 battle losses. The total number wounded was 205,690, of whom 80,440 were but slightly wounded. American divisions were in battle 200 days. A careful analysis of these figures will show that sanitation and preventive health measures accomplished vast good for our Army in the field. The figures for disease would be smaller but for the worldwide epidemic of influenza in 1917-18, which wrought deadly havoc in civilian as well as military communities. There were 40,000 deaths from pneumonia. Of this number 25,000 resulted from the influenza-pneumonia pandemic. In eight weeks, from September 14 to November 8, 1918, there were 316,089 cases of influenza and 53,449 cases of pneumonia among troops in this country. Meningitis caused 2,000 deaths.

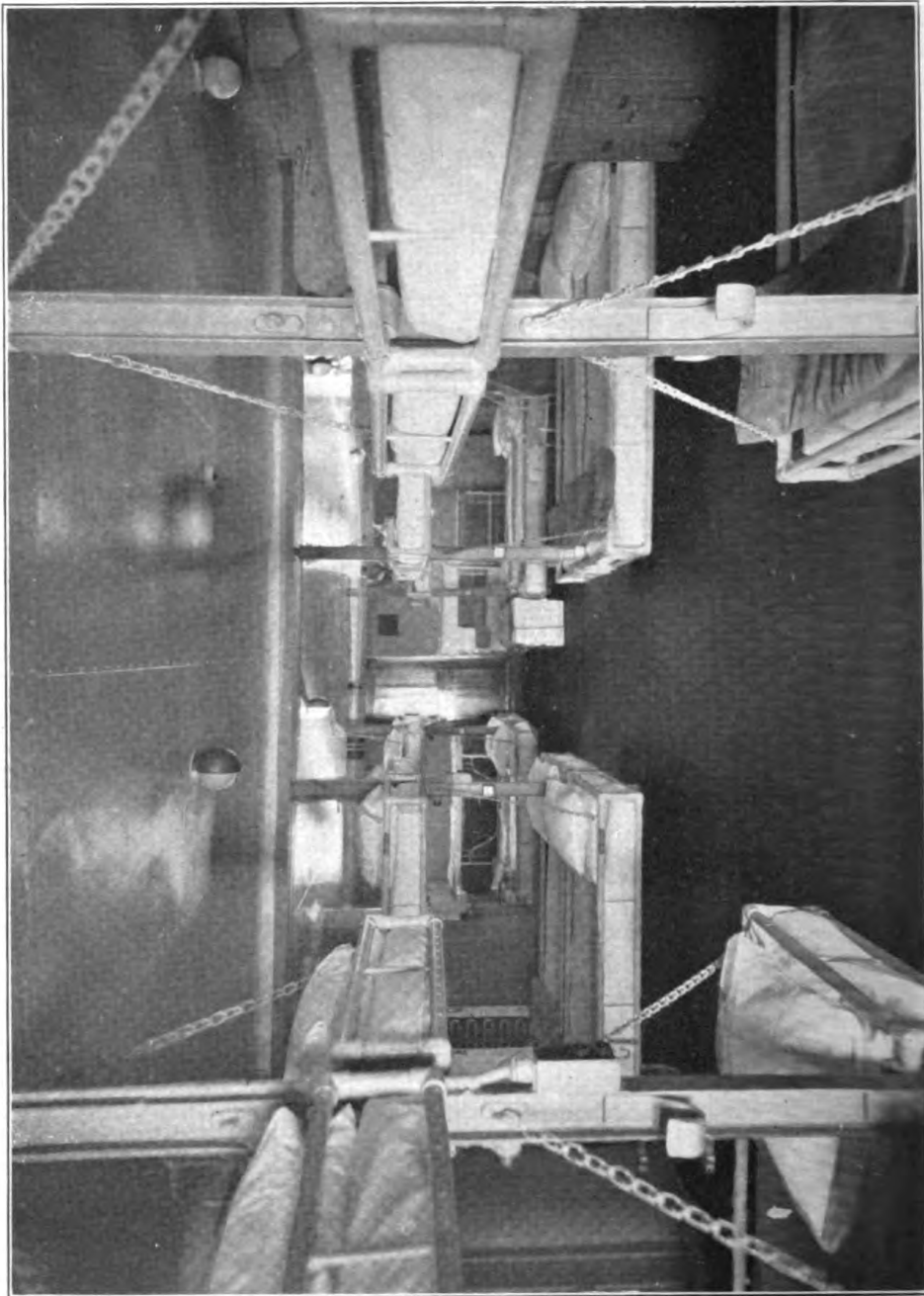
Pirogoff, the great Russian surgeon, who (in the Crimean War) was the first medical officer to employ women nurses at the front and ether on the field of battle, said: "Organization is everything." Military authorities have come to fully appreciate this in regard to

the fighting man, but even to-day they do not all seem to realize how enormous is the need of organization and training in the medical department. They still have a sort of feeling, and the general public is perfectly convinced, that a doctor is a doctor and if he can treat a sick civilian he can treat a sick soldier or sailor; that the brilliant surgeon without experience of military life can be dressed in a uniform and immediately become a useful member of an army, the more useful the more nearly his rank accords with the esteem in which he is held in civil life. This is all true enough in a sense, but it is also very false. The commander's chief concern is to bring his men to attack the enemy in the position most likely to secure victory. Everything else is of secondary consideration to him. The medical men have to do for themselves. The brilliant operator at the front loses half of his skill if he has no trained assistants, no skillful nurses at hand, and lacks an abundance of sterile dressings and instruments and the infinite assortment of things required to prepare his patients for operation and give them appropriate food and care afterwards. These people and these things must be collected and transported to the scene of his endeavor and thither must be brought with gentleness and dispatch the wounded who need his services. First of all, there must be system and direction in the collection and first-aid treatment of the wounded. Then they must be taken to shelter, revived, perhaps redressed, and then sorted according to the urgency of their needs and the character of their injuries. Then there is the assignment to definite hospitals at the front or the rear. The train and litter and nursing service for men in transit must be carefully worked out in advance if evacuation is to be orderly and effective. A hitch here means congestion of requirements and a deficiency in supply. To do all this requires special knowledge and special training and elaborate planning in advance. These things are not part of medical-school courses, and the ablest medical man in the world does not know them beforehand and can not evolve them from his inner consciousness.

So much for the surgeon. What of the physician? It is still true that if the war period as a whole be considered from training camp to discharge center, more men die of disease than of wounds. As soon as we begin to collect men in training camps diseases appear—very unromantic diseases, such as diarrhea, dysentery, measles, meningitis, and pneumonia, but fatal diseases nevertheless. To preserve the health of the men, so that they may be effective for the purpose of conquering the enemy, the army doctor must understand the hygiene and sanitation of camps and armies, a science in itself, and yet the sanitation and hygiene of civilian communities, even, receives very little attention in our medical schools, and not one doctor in a



Operating room of U. S. Hospital Ship "Relief," launched at Philadelphia, Pa., December 23, 1919.



Contagious ward, U. S. Hospital Ship "Relief," launched at Philadelphia, Pa., December 23, 1919.

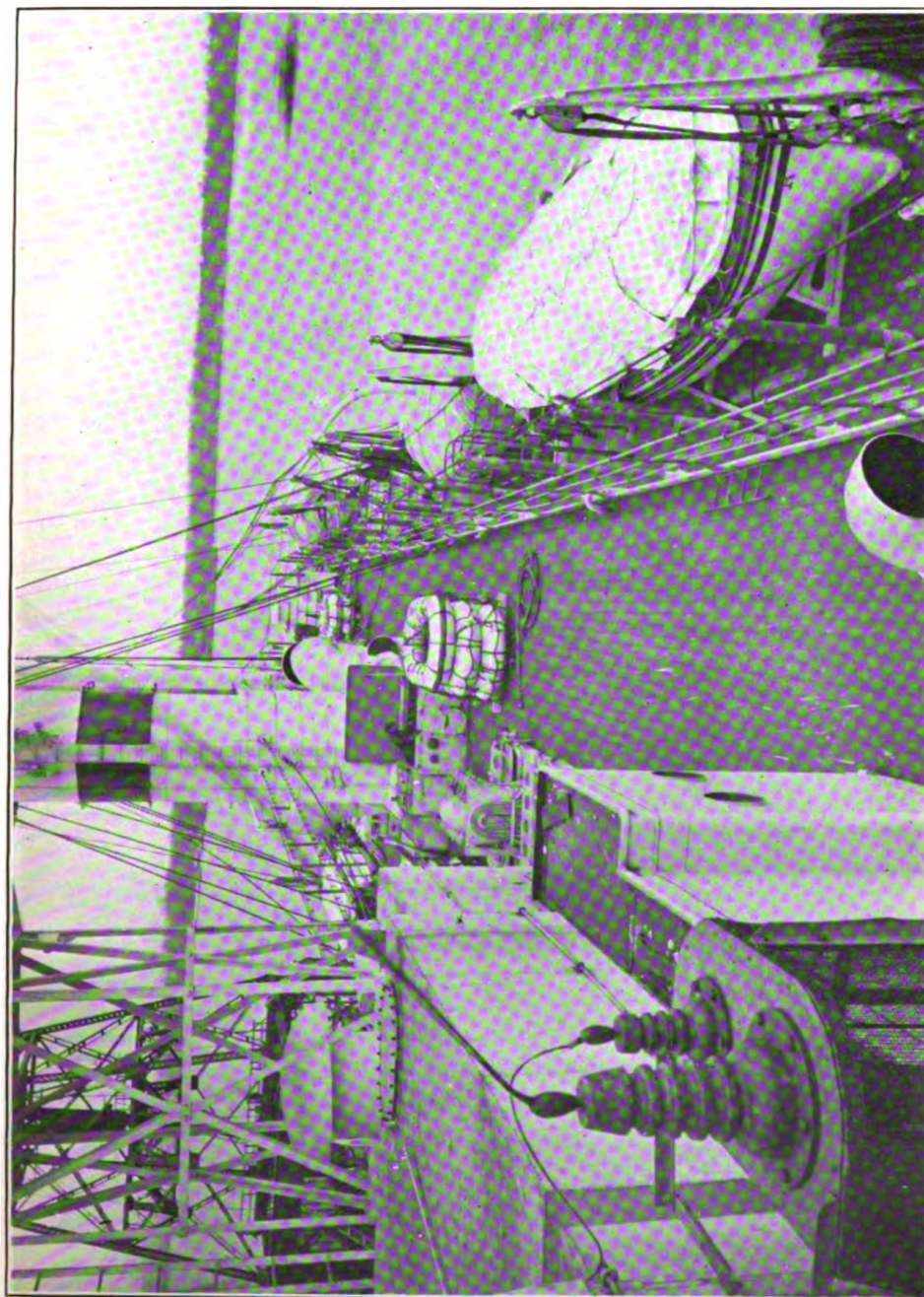
hundred—in a hundred of the best that could be named—has definite notions of how to dispose of garbage and sewage, to purify water, and install drainage—all matters of enormous difficulty when dealing with large bodies of troops in the field.

A full understanding of the food needed, of the energy he can develop, of the water, of the air space the soldier requires, of the clothes he should wear, especially his socks and his shoes, of the care of the feet, and of details of personal cleanliness are all far more important than technical skill in treating a wound. It is true that many of these things may be picked up after enrollment, but there is a frightful sacrifice of life, an enormous waste of men in the early period of war when the medical men start in totally ignorant of the military side of medicine.

The medical men in our Army accomplished marvels in Europe. The evacuation of sick and wounded, their treatment in hospitals, and *their return to the United States under the care of naval medical officers in ships manned and equipped by the Navy* was magnificently conducted. The surgical work done by our representatives was marvelous. We have reason to be proud of them, but the many justifiable grounds for satisfaction over what was accomplished should not breed a too complacent attitude or blind us to certain great outstanding facts.

We entered the war in April, 1917. It had then been raging fiercely for three years. The almost overwhelming problems which presented themselves from the first in every branch of military endeavor and those of peculiar importance for preserving the health of troops and for giving them proper treatment for wounds and disease had been very largely worked out by actual experiment by France and England. We went into the war aware of the mistakes and achievements of our Allies and able to profit by them. Our Allies were eager to point out the best measure in every emergency and to save us from the errors they had committed, and while we often improved on their methods we followed them in the main. Just as important as this was the fact that thoughtful, sagacious, farseeing, and devoted men in our skeleton Army and Navy had looked on with consuming interest as the tragedy of war was unfolding abroad, and, anticipating our possible involvement in the great catastrophe, had taken many a precautionary measure and started many a line of endeavor destined later to smooth out the difficulties that beset us. We wasted money, we made blunders, we were slow and unsatisfactory in many ways, but we developed an Army of 4,000,000 men from an Army of 200,000; a Navy of over half a million from one of 60,000 men, and when the pinch came, when Germany seemed about to crush our Allies, we were able to leap into

the breach and go with them to victory. How would we have fared if inclination had lead us or circumstances compelled us to receive the brunt of that stupendous onrush of the enemy in August, 1914? *What would have been our situation had we been first in the field?*



Main deck of U. S. Hospital Ship "Relief," launched at Philadelphia, Pa., December 23, 1919.

EDITORIAL.

ACCIDENTAL POISONING.

There occurred recently, in one of the hospitals of Washington, D. C., two deaths due to the accidental administration of bichloride of mercury solution instead of a solution of sulphate of magnesia. For the nurse who made this mistake one's feelings are mainly those of sympathy. We all make mistakes, and if the consequences of an error are not always of such grave moment as in the instance cited it is often owing to circumstances which worked for our rescue with no merit on our part.

It is not our business to criticize the institution where the fatalities occurred. But everyone who hears of such an occurrence should realize afresh how easily these tragedies may arise and be moved to increased vigilance in the handling of medicines. Medical officers ashore and afloat are dependent on the services of many subordinates, whose zeal and interest in their work is not accompanied by commensurate experience. A lack of years of training and the slow development of habits of caution and precision demand constant indoctrination. Every hospital should devise some system which will reduce to a minimum the probability, even though no mere system can absolutely exclude the possibility, of accidental substitution by some member of its staff of a dangerous or poisonous substance for an innocuous one. The same is true of dispensaries and sick bays aboard ship. Those who compound and dispense medicines and those who administer them should be constantly impressed with the responsibility resting upon them and drilled in the steps, familiarized with the routine which make mistakes unlikely.

In the case in question, to judge by current report, the bichloride and the magnesium solutions were in similar containers. No coloring matter had been added. The fatal doses were given at night and, through fear of waking other patients, enough light to read a label was not turned on. In some way or other the poison was temporarily on the shelf of a general medicine closet and not in the locker provided for poisons.

A set of simple, appropriate rules should be drawn up and posted in every ward, dressing room, dispensary, and sickbay. Every person who may conceivably have to dispense or administer a drug of any kind should master these rules and be required periodically to show

by actual performance that he carries them out. Some of the points demanding attention are as follows:

Poisons to be in special individual containers. A colored glass bottle and one roughened by projecting knobs is best. It should be impossible to mistake the appearance and feel of a poison bottle. Poison label. Special locker for poisons. Replace immediately in proper locker. Turn on plenty of light when working at night. Distinguish poison solutions by color whenever possible. Any person noting a bottle missing from poison locker should immediately report the fact. Any bottle, powder, or package found without label should be thrown away. Constantly inspect labels for accuracy and legibility. The reservation of a special place and of special graduates, etc., for those working with poisons lessens the danger of mistakes in compounding, but this type of mistake is rare.

Fatalities occur most commonly at the hands of those actually attending the sick and not of those habitually handling drugs. Such an attendant is often called on when alone, at night, perhaps when haste is imperative, to procure a common and familiar remedy and seeks it without realizing how easily a moment of forgetfulness on his part or some remissness by another may lead to terrible results. It is here that iteration and reiteration are necessary. Every nurse and sick attendant should know what substances resemble each other in outward appearance and be familiar with the grosser physical properties, their points of similarity and of difference. It is something, should error arise, to be able to discover it promptly. If a patient remarks that the familiar remedy tastes different from usual, that it is bitter when it should be sweet, salty when it should be tasteless, etc., prompt and intelligent action may yet avert disaster.

Dr. C. A. Stidston, writing in the *British Medical Journal*, February 12, 1921, states that the reports of the Registrar General for England and Wales for the years 1901-18, inclusive, show that in the given 18 years there were more than 10,000 deaths from poisoning through accident or neglect or in suicide and murder. The non-fatal poisonings that occurred are in addition, number not known. The suicides by poison numbered 8,500, leaving 1,500 and over for murder and accident. The leading poisons responsible for the 10,000 fatalities were as follows:

	Deaths.
Carbolic acid	1,740
Oxalic acid	1,439
Hydrochloric acid	1,249
Opium and derivatives	1,062

This writer recommends that an outfit for the treatment of cases of poisoning be assembled and held ready for emergencies by physicians, and that first-aid stations, police stations, hospitals (casualty

department), industrial plants, etc., should similarly be equipped for these alarming and urgent calls. The indispensables suggested are:

Stomach tube and funnel (adult and children's size), mouth gag, and gag for passing the tube.

Tongue forceps.

Hypodermic syringe.

Hypodermic tablets (apomorphine, strychnine, atropine, morphine, aconitine, pilocarpine, digitalin).

Capsules of amyl nitrite.

Pituitrin.

Two to four-ounce glass-stoppered bottles clearly labeled with indicated dosage of the following drugs:

Zinc sulphate, sodium chloride, mustard, brandy, coffee, tea, sal volatile, wood charcoal, permanganate of potash, dialyzed iron, syrup of chloral, magnesia, potassium bromide, chloroform, sodium carbonate, sodium sulphate, magnesium sulphate, vinegar, tincture of opium, olive oil, castor oil.

Spare bottles.

CONTRIBUTING TO THE BULLETIN.

Many medical authors in the Navy incline to send their articles to civilian magazines instead of to the United States Naval Medical Bulletin. There are two reasons for this. One is that they prefer the periodicals with a larger circulation, desiring a larger publicity for what they have to say. This is natural, but based on a misconception of the kind of publicity that counts.

The magazine which for its support depends in considerable measure on subscriptions need not and does not consider who the subscriber is provided he pays. Of 50,000 subscribers to a popular journal perhaps 48,000 belong to the rank and file of physicians needed to go round at the rate of 1 doctor to every 600 of the population. The other 2,000 comprise the leaders. The publicity that counts is publicity among the select few. The BULLETIN, with a 3,500 to 4,500 edition, supplies a picked body of men—the members of the Medical Corps—and then scientific societies, research laboratories, important industrial concerns, life insurance companies, teachers, health officials, medical schools, etc., until the edition is exhausted. Not a week passes but what requests come in for back numbers of the BULLETIN—requests originating from such sources as the English schools of tropical medicine and Australian libraries, and from business concerns, public institutions, and private individuals all over our country—in order to complete files for binding. Members of Congress are constantly calling for back numbers, sometimes asking for as many as 200 copies for distribution to their constituents. Our surplus distribution is therefore to the élite of the scientific world. Future BULLETINS are to be sent to all members,

active or inactive, of the various classes of the Medical Reserve Corps. Five hundred copies of the January and April numbers have been sent out to prominent physicians in the United States.

A much more reasonable ground of complaint is the fact that if a writer's paper arrives too late for the January number, which goes to press in November, it does not appear until April, a delay of five months. Being restricted by law to the presses of the Government Printing Office, two months are required to get the prepared copy converted into the finished product ready for issue.

The retiring editor advocates incorporating with the *BULLETIN* the invaluable "Notes on Preventive Medicine," issued by this bureau's Division of Preventive Medicine, and getting out the whole as a monthly.

THE OMISSION OF "THE."

The claim has often been made that it is easier to write a novel than a good short story. It would seem that it is easier to devise a fairly readable discussion of some general medical topic than to prepare a clear, short, yet full clinical report. In both types of article, but especially in the latter where brevity is really wanted, and in sanitary reports and official documents of all kinds, our naval contributors and others are increasingly inclined to omit certain words, as if with fewer words the meaning must surely be plainer. Generally speaking, short, uninvolved sentences and words of Anglo-Saxon origin—that is to say, an order and choice of words like those of the King James Version of the Bible—afford the best means of presenting a subject so as to be easily and quickly grasped. A little actual practice in deciphering manuscripts gives convincing proof that a superfluity of words is not as serious a blemish as the omission of essential ones, for the simple reason that it is easier for the reader to pass over excess than to supply deficiency.

Even if the reporter of an operation or clinical case disclaims all pretensions to literary ability, he must remember that the transference of thought to paper, and especially when the paper is intended to convey this thought to others, entails some regard for literary form and for a form different from that which is tolerated in conversation and from that which is often desirable for oratorical effect in public speaking. There is unquestionably a degree of brevity which makes for obscurity as well as inelegance. The single word *death* or *dead* may be uttered by the forensic orator with prodigious dramatic power on certain occasions. On the other hand, how often the telegram is the most undecipherable of messages! One may conclude a case history thus: *Death 2 p. m.* or *Dead, 2 p. m.*; *Died 2 p. m.* is a shade better; so also are: *Patient died 2 p. m.*; *Patient died at 2 p. m.* But why

not write: *The patient died at 2 p. m.*? The abbreviated forms are a departure from common modes of expression and every such departure, unless the common form is actually incorrect, does not lessen but increases the cerebation demanded of the reader, because people are in the habit of saying "the patient," and "patient" by itself means something entirely different. The constant omission of little words like *of, the, on, to, from, in, by, with, out, etc.*, is really confusing and fatiguing. The reading public is used to them, really relies on them, and to leave them out complicates the situation. In their proper place they do not perceptibly lengthen a sentence, the reader accepting them unconsciously. When they are omitted he must constantly supply them by conscious effort. Very often, too, these humble monosyllabics are an integral part of the grammatical structure of a sentence—that is to say, indispensable for accuracy—and when left out the writer's meaning may be seriously obscured.

Went to House might be a lucid heading for an epistle from Mr. Went to Col. House or be an extract from a presidential diary where House meant "*the House*," "*my House*," the White House. Making the usual discount for the Navy stenographer's inclination to capitals (not the presidential love of Capitals) and substituting a small *h*, *Went to house* becomes a very different matter. But who went? To what house? To *a* house or *the* house? Of course the reader discovers all this with little effort from the context; but if the author's extreme and persistent brevity, so called, amounts to syncopation he is not making for clarity, but simply forcing the reader to work harder because the writer worked less. Some saving is mere selfishness. Failure to dot *i*'s and cross *t*'s saves ink and time for the sender, but causes an explosion of expletives from the recipient very detrimental to his standing in the community and wastes his time.

We cheerfully recommend the elision of many whole sentences and the substitution of a new sentence for most parenthetical clauses, but we urge the retention of *the* and its congeners.

THE FUTURE OF NURSING.

The profound changes which have for some time been taking place in the social and economic position of women introduce serious problems in the profession of nursing. As late as 30 years ago there were practically but two fields of effort toward self-support open to the girl of good family and fair education. These were teaching and nursing. Teaching was a profession and a vocation involving hard and exhausting effort, most inadequately paid but generally regarded, and most properly regarded, as a high and noble one. Nursing, equally hard and involving much that was painful and

even horrible, was ennobled because of the heroism and self-sacrifice it called for. With such a limited choice of occupations for women and the increasing number of women who preferred work to dependence or charity, the training schools were able to select those of the highest type; those to whom nursing was a real vocation and not a mere means of earning their daily bread. The schools could choose for training those most likely to carry to the sick room ideals of duty calculated to sustain them through every trial and sacrifice. Now, the increased opportunities for the higher education of women and the extension of their employment to many new and remunerative forms of employment have greatly changed the situation. It is worth while for those concerned with questions of public welfare to give this subject the most careful consideration. We can not afford to go back to the situation in the early Victorian era, as described with such vividness by Dickens and other writers; to the times when the so-called nurse was an uncouth, dirty creature who now neglected the sick, now domineered over them, drawing the wages of an underpaid servant and consoling herself for the trials of her position by frequent and copious draughts of whisky and gin. It is true that whiskey and gin are no longer available for them, but we would not give it to them if we had it to give.

When under Henry VIII, father of Queen Elizabeth, England became officially a Protestant country, many nunneries were broken up. Throughout the Middle Ages and up to that time nursing was in the hands of nuns. They did not have much of what we would call to-day technical training, but they were earnest, conscientious, and self-sacrificing, and that is something money can not buy. In Latin countries nursing has continued to be largely in the hands of religious sisterhoods and many of the sisters are now capable and highly trained as well as devoted. England by the change of religion lost its devoted nurses. They were replaced by middle-aged and old women of the standing and intelligence of a char-woman. Of nursing, as we understand it, these old women knew nothing. A nurse in those days was a person to sit up with the sick at night, to clean the room, to prepare the body for burial if the patient died, who was paid about what servant girls were paid. Her greatest usefulness was in waiting on contagious cases, which very often would have died of neglect without her, so great was the general fear of this sort of malady. The work involved much that was both disagreeable and dangerous and was not sought after. This state of affairs continued up to the time of Florence Nightingale, who may be regarded as the founder of trained nursing in English-speaking countries. She obtained practical ideas for the movement in the little town of Kaiserswerth, near Düsseldorf, in

Rhenish Prussia, where a poor Protestant minister, Theodor Friedner, had founded a Training School for Protestant Sisters of Charity or Deaconesses. Miss Nightingale spent many months at this school and also in Paris, where she studied the methods of the sisters of St. Vincent de Paul.

We see, therefore, that from the sixteenth century to the nineteenth century nursing in England was on a strictly commercial basis. A very incompetent class was poorly paid for poor work—that is to say, adequately paid. The genesis of the modern nurse from the deaconesses of Kaiserswerth reintroduced the ideas of duty and of a vocation. This immediately raised the standard of performance, but the pay did not go up in proportion to the services rendered. The professional nurses of America have generally, in the past, been of a higher social class than in other countries. This was an advantage, for it implied more education and hence greater capacity to appreciate the psychic needs of the patient and to cooperate intelligently with the physician. It was a disadvantage because nurses of this type, on passing out of the larval condition of probationer and undergraduate, increasingly objected to actual manual labor and required domestics to wait on them. This made the trained nurse a doubtful blessing except to the wealthy.

To-day, while the trained nurse is indispensable to the successful practice of medicine, her demands in pay are prohibitive for people of moderate means—the majority of people—and nursing has fallen off in quality because the pay is still not good enough to attract the highest type. We do not wish to be misunderstood here. The profession numbers many, many women of the finest type, but it does not *attract* them as does the work of a social secretary, of a librarian, etc. Many business opportunities now present themselves which promise larger financial rewards, afford room for more ambition and initiative, and permit a personal freedom and independence not open to the nurse.

And so, from the inherent limitations of nursing as a profession, merely paying higher salaries does not settle the trouble, for that will not secure the woman calculated to make the best nurse and will infallibly attract a less desirable class. A return to a strict commercial basis is just what we have to fear. When the mere prospect of gain replaces a sense of devotion and duty, nursing becomes a business instead of a calling, and on a purely business basis nursing is bound to be unsatisfactory to doctor and patient. The physician's calling is not on a strictly commercial basis, and while each of us constantly wishes that so far as he himself is concerned it were so, we recognize that our best title to the confidence and esteem of the public is the fact that our services are only rewarded with a living wage and

not in the same way that a lawyer is remunerated. The lawyer who saves a man from suffocation has won an important criminal case and gets—about all the client has. The doctor who brings a man through pneumonia or spansks a blue baby is highly paid at \$5 a visit.

Apparently the only solution, for the present at least, is to renounce the idea of private nursing except for the millionaire and to send all ordinary mortals to hospitals unless some system of graded service can be introduced.

There are many cases of sickness which could be tended by some intelligent member of the family if that member had received even a little instruction and could afford to take the time from a wage-earning occupation. Not every malady requires the highly specialized services such as are called for in the operating or consulting room, in the handling of nervous or surgical cases or of a critical disease like lobar pneumonia. It would be a vast help to physician and patient if some kind, industrious, and capable woman, possessing a common-sense appreciation of the requirements of the sick room derived from a year's hospital training, were available for the simpler cases at a cost somewhat proportioned both to the needs and the means of the sufferer.

COMPARATIVE VALUES.

The price of whisky is reported to be all the way from \$7 to \$20 a quart, according to the locality and circumstances of its sale. A bottle of Canadian Club whisky used to retail for about \$1.50. This is the exact present cost of each quarterly number of the *Annals of Medical History*, the only publication on this subject in America which can in any way compare with what the presses of Europe had been turning out for years before the war and are now issuing again. In order to produce the *Annals*, as a veritable édition de luxe, the publisher probably loses from \$1,000 to \$2,000 a year on the enterprise, and he does this primarily as a book lover laying an offering on the altar of that love. In the next place the publisher belongs to a craft and takes a pride in that craft. The craft labors for perfection of workmanship. The factory and the corporation aim at wholesale production, which at once lowers prices and increases profits, but profit through reduced prices requires explanation. The explanation is inferior quality. The factory is not an unmixed blessing. It has in many ways debased labor. The printing press has made it possible for every one to have books, but it makes easy the printing of much that is inferior, useless, even demoralizing. The cannery makes it possible for the humblest home to enjoy vegetables throughout the severest winter, but canned vegetables lose in flavor and food value. Fresh vegetables not only cost too much for the

average family, but the time required for their cultivation, preparation, and cooking is not available.

The factory and the capitalization of labor have an inevitable tendency to make man an accessory to a machine and to make him work mechanically. In spite of all the spoken and written nonsense and the namby-pamby things done about the revival of arts and crafts, the fact remains that the man who puts out a product as his own works with enthusiasm, honesty, sincerity, ambition, and generosity, or, as the Italians would say, *con amore*. Originality, charm, and durability depart with the pooling of effort. In modern industrial life the products of initiative and industry rise like cream to the top to be skimmed off for the men at the top.

The old guild was a labor organization of a kind, but it put excellence at a premium. Rivalry was for quality not quantity. Men wore special garments to indicate their calling, and their social life centered around the guild. To-day the dairy maid wants to dress like the duchess, the cash girl like the countess, and as they can only deceive the superficial glance there is enormous demand for shoddy fabrics. There are still a few restricted localities in Europe where the working man and working woman wear with pride a class costume, and in these localities the quality and durability of textiles are considered.

America is all for speed and quantity. Cathedral building is a form of endeavor which has retrograded in the past five or six hundred years. It took a century or two to build a proper cathedral, and as the demand for cathedrals has fallen off very considerably there is no incentive in America to put up cathedrals in sections, cut out by the score and susceptible of being put together without the fee to an architect. Quantity, speed, and profit constitute the criterion of most forms of modern business. Our factory-made shoes are from leather that has not been thoroughly dried and cured, and our cigars are made from tobacco that is not properly cured. Our dwellings are put up with green timbers and occupied before the plaster has dried, because if one waits for that it will crack and come down. By the time the plaster has dried the building has begun to settle on foundations laid in made land—made of garbage and tin cans.

The modern department store has certain advantages but many disadvantages for the bona fide shopper. Every conceivable article is collected under one roof, but this roof is from six to twelve stories farther from the ground than is the case with the small shop, and one or two mistakes in seeking the right section or floor and the long walks one has to take as the result of being misdirected negate the supposed saving of time. The real outstanding merit of the department stores is in wet-weather shopping. The department

store furnishes daily hectic diversion to thousands of would-be shoppers who for lack of money to spend can at least pretend to be shopping. They can have the pleasure of pricing things and of becoming qualified to advise those who are able to buy. They can ride up and down on the elevators and divide with floor walkers and salesladies (the saleswomen of a more genuine generation) responsibility for the safety of their children.

The publisher of the *Annals of Medical History* may get a small return from his thousand-dollar investment because the work advertises him as a maker of beautiful books, but he does assuredly get huge satisfaction from the consciousness of being a creator and producer of something worth while. Many Americans—and others—spend a thousand dollars a year without any compensatory satisfaction.

The editors and contributors receive no emoluments from the *Annals*. This is very un-American, un-British, un-French, un-Italian, very antiquated, in fact, but very fine. The people discussed in the *Annals* are all dead, and so it's rather un-American to bother about them, for they went out of fashion long ago; but then the copyright on their works has expired, which is a business feature! And there is profit in exploiting and learning about these old heroes. They were heroes, most of them, and heroism always finds its worshipers.

We hope that no considerations of finance or policy will cause the periodical mentioned to be engulfed by the "big concern," whether medical, social, or typographical. In any such capacious maw its distinctive flavor would be lost, its value largely reduced and digested.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. TAYLOR, Medical Corps, United States Navy.
Lieutenant Commander LUCIUS W. JOHNSON, Medical Corps, United States Navy.
Lieutenant Commander W. A. BLOEDORN, Medical Corps, United States Navy.
Lieutenant J. J. SALE, Medical Corps, United States Navy.
Lieutenant A. H. EHRENCLOU, Medical Corps, United States Navy.

GENERAL MEDICINE.

ROGER, H., and SCHULMANN, E. *The mechanism of hiccough.* Press. Méd., Paris, February 26, 1921.

The recent epidemic of hiccough prevalent in Paris furnished the opportunity for a scientific study of this subject. The report is prefaced by a historical note. The authors believe that the French word for hiccough, *hoquet*, is of Breton origin and hazard the guess that both the French and English words are derived from Sanskrit and have an onomatopœic force. Hiccough was recognized as a pathological sign by Hippocrates, but its definite organic relations were not studied until the eighteenth century. Boerhaave attributed hiccough to "a spasm of the esophagus which raised the stomach and diaphragm and immediately caused the latter to descend." Hoffman discarded this theory and defined hiccough as "a convulsive movement of the diaphragm and adjacent parts, intermittent, painful, accompanying inspiration and marked by explosion of sound in the air of the mouth." Haller referred hiccough to a functional disturbance of the respiratory apparatus due to involuntary spasm of the diaphragm. This is the modern view and the more scientific designation glotto-phrenic myoclonia has been suggested.

The authors made a study of the thoracic movements of a patient aged 37 who had suffered for 3 days from hiccough. The clonic spasm occurred regularly with every third or fourth respiration. He promptly rejected all solid or liquid food, but in spite of exhaustion from hunger and sleeplessness the patient was able to go to the laboratory of experimental pathology of the Faculty of Medicine, Paris.

Graphic tracings of the chest movements were obtained during the hiccoughing and during a resting stage which lasted for several hours.

These observations establish the fact that the characteristic sudden, spasmodic inspiration is preceded by an equally spasmodic forcible expiration. The phenomenon, therefore, presents two distinct phases. Of these the first is ordinarily unperceived and consists of an expiratory spasm. The second is the familiar inspiratory spasm. The recording stylet registers a drop of 16 to 22 mm. below the horizontal tracing of normal respiration and immediately rises sharply 15 to 25 mm. above the abscissa. Then comes a sharp drop to the plain respiratory curve. Exceptions to this sequence occur. Sometimes the drop for the expiratory spasm (recognized only by pneumography) occurs, but the typical rise for the inspiration is abortive and the hic-cough sound is not produced. Less commonly the tracing fails to reveal the preliminary exaggeration of expiration. Between the diaphragmatic spasms the respiratory tracing is by no means normal. The movements are rapid—23 to 29. In the patient's period of freedom from hiccoughs the respiration dropped to 18 with an amplitude of 4 to 12 mm., whereas during the period of hiccoughs the amplitude varied from 12 to 18 mm. These figures have only a relative value, but they were obtained during continuous observations on one day, the instrument not having been removed from the chest. During the quiet interval, respiratory movement was reduced, but did not become normal. Occasionally there occurred an exaggerated expiration followed by an exaggerated inspiration, but the phenomenon of hic-cough did not develop, the violent spastic feature being absent. The two movements were imperceptible except from the tracing.

On the administration of bismuth preliminary to radiography the hiccoughing stopped for 20 minutes and then began again, first at long intervals and presently at the previous rate. By means of the X-ray it was determined that each spasm was preceded by a sudden synchronous elevation of both vaults of the diaphragm, coincident in time with the preliminary expiration. The movement is brief and often hard to see. At times there is an ephemeral, tetanic, fibrillar contraction of the vaults. Both the stomach and the esophagus participate in the upward movement of the diaphragm. Their movements show three periods: First, sudden rise; second, sudden drop; third, slow rise. (J. S. T.)

MEAKINS, J. Gases in human arterial blood in certain pulmonary conditions: their treatment with oxygen. Jour. Path. and Bact., Edinburgh, January, 1921.

Not enough attention has been paid to the subject of anoxemia evidenced by slight cyanosis. A comparatively short and sudden deprivation of adequate oxygen supply to the tissues has disastrous results particularly to functions of cardio-vascular, nervous, and glandular systems. In pneumonia the saturation of the arterial blood with oxygen is definitely reduced. To remedy this the inspired air must

be definitely enriched with oxygen. The ordinary method of administering oxygen by funnel is useless. Haldane's method, on the other hand, is economical and efficient.

During the war the after effects of suffocative gas poisoning were treated by more or less continuous administration of oxygen, either by the Haldane method or by enriching the inspired air to about 50 per cent oxygen. The administration was chiefly while the patients were asleep. A conspicuous symptom in these cases is the difficulty of taking a deep breath. Even on exertion the shallow breathing continues. It was found that if the respired air was charged with CO₂ up to 6 per cent deep breathing took place.

Asthma, emphysema, and chronic bronchitis all show consistent lowering of the percentage of arterial blood oxygen saturation. The lowered saturation is roughly proportionate to the chronicity of these diseases, and in the very chronic cases it is difficult to correct the anoxemia whether due to lack of expansion of the lung or organic structural changes in the alveoli. The temporary relief afforded by increasing the oxygen of the respired air is noticeable.

In pneumonia the degree of cyanosis and the degree of lowered oxygen saturation of the arterial blood are distinctly related, not so the degree of lowered saturation and the extent of the actual pulmonary lesion. It is also to be noted that the cyanosis is greater with a rapid respiratory rate. In lobar pneumonia the oxygen saturation is always lowered, and hence oxygen administration is always indicated, not so much as a curative measure for the disease itself but to prevent cardio-vascular and nervous phenomena of grave import.

(J. S. T.)

HANSEN, O. S. **Magnesium sulphate in arsenic poisoning.** Jour. Pharm. and Exper. Ther., March 21, 1921.

Detailed report is made of experiments on rabbits to determine the value of magnesium-sulphate solution subcutaneously to neutralize the effects of Fowler's solution given by hypodermic and by mouth. While no definite conclusions are drawn, it is stated that the magnesium-sulphate treatment prolonged the average life of a series of rabbits from 219 to 415 hours, but can not be said to have saved life in rabbits. In large doses and to some extent in small doses magnesium sulphate is toxic. The susceptibility to arsenic poisoning varies with the individuals experimented on. (J. S. T.)

CHEINISSE, L. **Treatment of encephalitis lethargica.** Press. Méd., February 19, 1921.

The author briefly reviews the various methods of treatment used empirically but without success—antitetanic serum, serum of convalescent cases, even autoserum therapy, for which Brill claimed

4 prompt recoveries in 5 cases. Cheinisse holds that the injection of spirits of turpentine is productive of better results than any yet obtained by other measures and cites the work of A. Netter. Netter treated 83 cases with injections of spirits of turpentine. In 67 cases abscesses developed which were incised. Among these 67 cases there were 5 deaths, a mortality of 7.46 per cent. In the 16 cases where injection was not followed by abscess there were 15 deaths, the one survivor having a mild attack.

The injection must be given early, since recovery is more rapid and complete the sooner the treatment is instituted. If one injection does not suffice, a second is given within 48 hours. The site of the first injection is the subcutaneous connective tissue half way between the anterior superior iliac spine and the navel of the left side. A second injection is made at the corresponding point on the right. Old turpentine is the best. The dose for adults is 1 to 2 c. c., for children 0.25 to 0.50 c. c. The abscess is not opened until fluctuation is detected.

Netter gives second place to urotropine and prefers administering it in frequent doses by mouth to the intravenous method, which is rapid but evanescent in its effects. Inasmuch as the prolonged exhibition of urotropine may cause dysuria and hematuria, the dosage must be reduced as treatment continues, coming down from 2 to 1 gram. Turpentine and urotropine may be used together. (J. S. T.)

AMATI, A. A new urine test for the diagnosis of nephritis and malignant tumor. *Pollclinico*, Rome, *Sez. Prat.*, February 28, 1921.

Previous experiments having determined that normal urine is not hemolytic but has antihemolytic properties regardless of specific gravity, reaction, urea content, etc.; and having ascertained that in certain subjects of nephritis and malignant tumor the urine acquires globicidal power or rather loses its antihemolytic properties, the question arose whether these facts could be used as a basis for practical diagnostic purposes.

Studies were undertaken to determine the amount of distilled water (one of the simplest hemolytic substances) required to render the urine hemolytic.

A series of eight test tubes were prepared as follows:

- First tube containing 6 c. c. normal undiluted urine.
- Second tube containing $5\frac{1}{2}$ c. c. urine and $\frac{1}{2}$ c. c. distilled water.
- Third tube containing 5 c. c. urine and 1 c. c. distilled water.
- Fourth tube containing 4 c. c. urine and 2 c. c. distilled water.
- Fifth tube containing 3 c. c. urine and 3 c. c. distilled water.
- Sixth tube containing 2 c. c. urine and 4 c. c. distilled water.
- Seventh tube containing 1 c. c. urine and 5 c. c. distilled water.
- Eighth tube containing $\frac{1}{2}$ c. c. urine and $5\frac{1}{2}$ c. c. distilled water.

A patient's finger is then pricked, and blood drawn from it into a pipette, from which 2 drops are added to each of the test tubes, which are then incubated at 37 C. for 48 hours. It is found that normal urines usually require $5/6$ dilution and that this is nearly constant for all urines. The smallest dilution required to render the urine hemolytic is designated the uro-hemolytic coefficient. While this is usually $5/6$ it may vary physiologically from $2/3$ to $10/11$. In practice it is only in the sixth, seventh, and eighth test tubes that a hemolytic fluid is obtained and often only in the seventh and eighth.

When, however, we pass from physiological to certain pathological urines, using the same experiment, entirely different results are obtained. Where the urine is obtained from patients suffering with nephritis and malignant tumor the uro-hemolytic coefficient is markedly altered. In these cases hemolysis is often obtained in the second test tube, where the dilution is only $1/11$, or in the third with a dilution of $1/6$, or in the fourth with a dilution of $1/3$. Now, while the urine in nephritis and malignancy is occasionally hemolytic without dilution, and while this hemolytic character varies widely, what is constant is an alteration of the uro-hemolytic coefficient. In view of the extreme simplicity and ease of application of this test the author offers it for confirmation or rejection, and as a point of departure for further research by other investigators. (J. S. T.)

FINDLAY, G. M. Study of leucocyte changes in pellagra compared with those occurring in beriberi. Jour. Path. and Bact., December, 1920.

The observations were made with controls to allow for changes due to physiological activity. The cases of pellagra studied were Armenian refugees in Egypt. Three blood films were made from each patient and 200 leucocytes counted in each film.

Neutrophil leucocytes.—The percentage is decreased. In the controls the variation was 49 to 75; in pellagrins, 17 to 67. The average in pellagrins was 47 per cent; in controls, 62.5. The ratio of young to adult forms in controls varied from 1 to 1.73 to 1 to 9.80, while in pellagrins the variation was from 1 to .55 to 1 to 4.5. But while the proportion of adult forms is reduced in pellagra the opposite obtains in beriberi.

While in many diseases—cancer, liver abscess, amebic dysentery—there is an increased tendency to nuclear excrescences or pseudopodia in the polymorphs, the opposite condition prevails in pellagra, and the formation of pseudopodia is reduced.

Lymphocytes.—The writer has not been able to confirm observations made in Italy and Roumania to the effect that large mononuclears are increased in pellagra. The work done in this field in

Italy and the Balkans may have been vitiated by the presence of malaria, since the increase of large mononuclears in malaria persists after the disappearance of the parasites.

In 88 per cent of the pellagrins studied by the writer the small lymphocytes formed 30 per cent of the differential count. In the remainder they varied from 24.9 to 29.4 per cent. This is striking in view of the controls where the highest small lymphocyte count was 24 per cent, and the average 20.6 per cent, compared to 37 per cent average in pellagrins.

The increase in small lymphocytes occurs early in the disease, while the evidences of pellagra are confined to the intestinal tract and before the development of cutaneous symptoms. After the disappearance of all symptoms the lymphocyte increase subsided. Relapses were marked by a renewed increase. Active ameboid movements characterize the lymphocytes in pellagra.

As regards the total percentage of lymphocytes, total counts were made in 10 pellagrins and 10 controls. The average of the former was 7,750 per c. mm., and of the latter 7,600 per c. mm., showing a very moderate leucocytosis in patients. Thus while the polymorphs are only slightly decreased the lymphocytes are materially increased in pellagra.

No definite changes in monocytes were found.

Eosinophils were found to be slightly increased even where no helminthic infection could be discovered.

To contrast these findings with the blood picture in beriberi, 16 male European patients, all suffering from the edematous type, were studied. For a week prior to the blood examination they were fed on a diet as free as possible from neucleoproteins. The differential leucocyte count scarcely deviated from normal. The average for the 16 cases was:

	Per cent.
Neutrophils.....	64
Lymphocytes.....	25
Monocytes.....	8
Eosinophils.....	3

The ratio Y:A is somewhat higher than in pellagra, the lowest being 1:3.02, the highest 1:9.30.

The highest lymphocyte count was 34 per cent, the average for the series being 25 per cent.

It has, however, been found that in the Tropics native races tend to show a slight lymphocytosis even in health, while after some years' residence the same change is noticeable in Europeans.

Total leucocyte counts revealed a slight decrease in the actual number of leucocytes present, the average count being 5,500. (J. S. T.)

BORDLEY, J. Ocular manifestations of disease of the paranasal sinuses. Arch. Ophthal., March, 1921.

The diagnosis of paranasal sinus disease may be easy. Often it is a matter of considerable difficulty. Transnasal inspection alone can not be depended on, for it reveals but three conditions—pus, polypi, and necrotic bone. Transillumination is helpful only in the anterior cells. The chief reliance must be on radiography. Here a single negative finding does not exclude sinus disease. Experience in reading plates is essential here, and it is imperative that the exact plane in which they are taken be defined. Ophthalmologist and rhinologist must cooperate closely in these cases.

The author discusses only optic-nerve disturbances, merely referring to the extensive modern literature of general ocular disturbances occurring with sinus disease. Certain symptoms, however, are mentioned as sufficiently frequent to have diagnostic value: Orbital neuralgia, fugitive edema of eyelids, congestion of conjunctiva, recurrent episcleritis, and paralysis of one or more ocular muscles. These conditions are not constant, but when present are suggestive.

The author believes that the most usual ophthalmoscopic picture is that of dimness or haziness of the margins of the disk.

Inflammatory neuritis, retrobulbar neuritis, and choked disk are also found. Like haziness of the disk margins, these symptoms alone are suggestive. In the author's series inflammatory neuritis was more frequently met with in early adult life and in association with moderately acute nasal symptoms; retrobulbar neuritis occurred in chronic types of sinusitis and the author has come to regard choked disk as a possible indication of serious extension of sinus disease.

The author does not consider enlargement of the blind spot a constant symptom of paranasal sinus disease. He has never observed it in connection with infection of the maxillary antrum and deems it more frequent with disease of the posterior than of the anterior sinuses.

Disturbances of color perception and visual acuity often lead to the discovery of paranasal sinus involvement. Scotomata and loss of accommodation are prominent causes of reduced vision in the cases under consideration. (J. S. T.)

Bowcock, H. M. Serious reactions to repeated transfusions in pernicious anemia. Bull. Johns Hopkins Hosp., March, 1921.

The author, after carefully analyzing six illustrative cases, draws the following conclusions:

1. In certain patients suffering from pernicious anemia, who have been transfused repeatedly, transfusion becomes self-limited because of the inadequacy of methods for selecting suitable donors.

2. This difficulty having once been discovered, no attempt should be made to transfuse these patients.
 3. The severe reaction is probably due to an anaphylactic manifestation, and not to hemolysis per se.
 4. Blood matching should be carried out with the greatest care; whenever possible the incubation period should be at least two hours or longer.
 5. Blood serum, free from cellular elements, may produce bone-marrow stimulation.
 6. Members of Group IV can not be regarded absolutely as universal donors. (J. S. T.)
-

HOLDEN, W. A. Ocular manifestations of epidemic encephalitis. Arch. Ophthalmol., March, 1921.

We quote from this article the following summary of eye symptoms noted in 100 consecutive case histories of epidemic encephalitis at the Mount Sinai Hospital, New York.

A. OPTICUS SYMPTOMS.—Blurring of the optic disks in 4, papillo edema in 1.

B. OCULOMOTORIUS AND ABDUCENS SYMPTOMS.

1. *Ptosis*.—Of both eyes in 45, of one eye alone in 11—in 56 patients in all.

2. *Extrinsic muscles of the eyeball*.—Paresis or paralysis of both external recti in 17, of the right external rectus alone in 14, of the left external rectus alone in 13—in 44 patients in all.

Paresis or paralysis of both superior recti in 1, of both internal recti in 4, of the right internal rectus alone in 1.

Paresis of both internal and both external recti in 2.

Paralysis of all muscles supplied by one 3rd nerve in 1.

Paralysis of conjugate dextroversion of both eyes in 2.

In all, weakness of the ocular motor muscles that would give rise to diplopia in 55 patients.

Nystagmus in 32 patients.

3. *Pupils*.—Irregularity in 15, inequality in 20. Sluggishness or absence of light reflex in 35 patients, in 13 of whom the convergence or accommodation reflex was sluggish also.

The irregularity and inequality of the pupils in 28 of the 35 cases were in eyes with sluggish pupils, so that irregularity and inequality not associated with sluggishness were noted but 7 times.

4. *Accommodation*.—Weakness of accommodation in both eyes in 1.

C. FACIALIS SYMPTOMS.—Weakness of some or all of the muscles supplied by the facialis of both sides in 24, of one side in 49—in 73 patients in all. (J. S. T.)

BENSAUDE, R., and ERNST, H. **Diagnosis and treatment of hemorrhoids.** *Presse Méd.*, March 2, 1921.

No extended review of this paper is attempted here, but one or two simple practical points are touched on as noteworthy. As the authors state in the opening paragraph, in many cases hemorrhoids are dismissed as trivial or their significance is underestimated through carelessness in examination or because of improper methods. For instance, an external hemorrhoid may have little importance, yet coexistent with it there may be internal hemorrhoids of marked degree. Again, hemorrhoids may be associated with or due to malignant ulceration higher up. With the patient in the knee-chest position and the anal region exposed to a good light, eversion of the mucous membrane should be obtained. The physician or surgeon places his thumbs on each side of the anus and makes traction away from the mid line of the body, the patient assisting by moderate straining. The surgeon's thumbs and the region involved should be perfectly dry. A preliminary enema with a saline or glycerinated solution is of advantage.

(But even with this procedure one is often surprised to find at operation a more serious involvement than was anticipated, and it is easy to see that under certain conditions this might be a real source of annoyance, e. g., one might have given a too favorable prognosis as to probable period of detention in bed, etc., or have undertaken on board ship an operation that should have been, for surgical or military reasons, performed ashore.—J. S. T.) The authors employ a Bier cupping glass, which for the obese should be of oval pattern. Minor precautions are to lightly grease the edges of the glass and to warm it. These prevent entrance of air to the cup and its obscuration from condensation of moisture. The cupping glass should be so applied that the anal orifice will correspond to its center. If bleeding begins when the cup is exhausted by the piston syringe connected by a long rubber tube, touch the bleeding point with adrenalin, and if this does not suffice, delay further examination for 24 hours. If the examination is lengthy moisture will condense in the cupping glass. If an antisweat pencil is available use it. If not, wipe out the cup with a cloth wrung out in very hot water.

A little preliminary study of the appearance of the normal mucous membrane when a cup is applied is indispensable for avoiding wrong conclusions. The normal mucous membrane when cupped assumes a purplish hue.

In using endoscope or rectoscope some experience is necessary, for this instrument by its introduction tends to flatten out and empty the hemorrhoidal tumors. Simple prolapse of mucous membrane is distinguished from prolapse with hemorrhoids by the examining

finger. In the former case the finger finds itself in a roomy space, in the latter it is imprisoned and crowded by the tumors.

While the curative treatment of hemorrhoids is essentially surgical, temporary relief may be obtained by various astringents. Only some of the newer agents are mentioned. The *teskra*, an indigenous Algerian plant of the order Compositæ, or the *Echriopsis spinosus*, has been highly recommended. This plant contains a glucoside and an alkaloid, which are active stimulants of muscular contraction, and so it has been widely used in northern Africa as an ectopic. Rodillon, of Nancy, has prepared an extract of *teskra* which he gives internally in 90 drop doses t. i. d.

The sufferer from hemorrhoids should possess a small syringe of the ear-syringe type (but more nearly the size of the Politzer bag) and employ warm water preliminary to the ordinary evacuation. This relieves pain and secures complete emptying of the rectum, which is important, as remains of fecal matter constitute in such a subject an irritant prolific of infections and further hemorrhoids.

When hemorrhoids become unusually congested and painful, the following may be employed:

	Grams.
Ferripyrrine.....	0.01
Extract of belladonna.....	.03
Cocoa butter.....	3.00

Suppositories of the double salt of quinine hydrochlorate and urea (0.18 grams to each suppository) have proved useful. Another formula is:

	Grams.
Oxychloride of bismuth.....	0.05
Oxide of zinc.....	.15
Adrenalin.....	.005
Chlorohydrate of eucaine.....	.05
Menthol.....	.05

(Per suppository.)

In using local applications of ice remember to coat the parts heavily with vaseline. Following a discussion of the value of various injections for the cure of hemorrhoids the authors report their preference for the chlorohydrate of quinine and urea and claim that its use brings the cure of hemorrhoids within the range of office and dispensary practice, though the danger of infection is real and must be guarded against by the most minute precautions.

MACALLISTER, C. J. What venereal diseases cost the community. Soc. Hyg., January, 1921.

This very readable article by an English worker considers the probable economic burdens of venereal diseases and opens our eyes more clearly to a very important phase of the venereal scourge.

The value of medical men as unconscious economists is seldom thought of by the public, and least of all by themselves. If a life is saved, a disease cured, or a child rescued from becoming an inefficient citizen, money is saved in the end to those who would otherwise have to support the inefficients and their dependents. This applies to all classes because of the interdependence of one class on another. A public measure becomes such because of a public interest, and an interest usually is based upon an economic factor to national life and national wealth. In former times the taking of certain active steps by medical men involved great responsibility, while now not to take such steps likewise involves great responsibility. This is apparent in the development of aseptic surgery. The surgeon's carrying from case to case, in his pocket, knives and instruments washed and ready for use would to-day constitute a public menace of grave concern. But, before the days of asepsis, this was considered quite proper, and along with it one fatality out of three in amputations was considered an acceptable misfortune. The public and social interest in asepsis is unquestioned to-day and its economic value beyond estimation. The compulsory vaccination against smallpox is a well-accepted economic measure, and the public mind and the law have been directed toward the control of other contagious diseases that they may be kept from entering the country and thus protect the health and lives of the community.

Vaccination was at first received with opposition and resentment by the unenlightened. Many do not wish to consider or discuss the sociological and economic aspects of venereal diseases. Here the relationship between knowledge and responsibility has a two-fold complexion; first, the personal onus on the part of individuals to avoid risk of contagion or having become infected, to take care that they do not infect others; and, second, society having learned and being still in the process of learning a great deal concerning the widespread and serious effects of these diseases upon the community has a responsibility with reference to their prevention and cure which may not be shirked. Throughout the ages some form of legislative measure has been directed against this evil. Relationships outside of whatever type of marriage or association between the sexes existed in any society, civilized, tribal, or barbarous, have usually been considered promiscuous. That disease has been related to it may be presumed because the laws referring to morals have almost invariably had for their main object the prevention of disease. This is apparent in the Mosaic law.

The infected men have, practically speaking, never been included in these laws. These laws have been applied to the infected woman and never to the person who originally infected her, and what is

worse yet, often takes the disease into the realms of matrimony, transmitting it and its ill effects to the second generation and beyond. The problem from a sociological viewpoint is a bisexual one and regulations must apply as much to one sex as the other. In order to bring about a right sentiment against venereal disease among the people the public must learn the economic aspects of the problem. The adult person suffering from a permanent damage and the child who is injured as the result of these diseases must be looked upon as economic disasters. Syphilis is not easily cured; it is still potential during apparent convalescence; impairment often ensues, leading to early deaths and disablements, and the dependents of these become the objects of public charities. Modern States tax themselves heavily for the education of children. It costs ten times as much to educate a child deaf from congenital syphilis, and seven times as much to educate a child blind from gonorrhea or syphilis, as it does to educate a normal child, and as much as 55 per cent of all blindness is due to these unnecessary diseases. No less than 8 per cent of the children admitted to a hospital for general conditions having no reference to syphilis showed evidence of congenital infection.

Who pays for the last school days, the medical treatment, and the mental and physical disabilities suffered by children from the direct heritage of venereal diseases but the public? If the provision for the money for all these purposes came up in the budget for separate consideration what would they say? Osler estimated that 60,000 deaths annually are traceable to syphilis alone. Add to these the syphilis-borne disabilities and all the cases and consequences of gonorrhea, and think! Disease always costs money, and the cost of syphilis and gonorrhea is enormous. Treatment centers alone in Great Britain cost not less than £340,000 in the three years ending March 31, 1919. The estimated expenditure for the year 1920 was £314,000, and year by year this sum will increase. In England and Wales alone the cost to the country before the war for the care of those suffering from general paralysis of the insane was £190,000, and if there is added to this the sum due to other forms of insanity the annual cost is estimated by asylum authorities at not less than £150,000, or over £1,000,000 in seven years.

These are direct money losses; what about the indirect ones? The loss in earning power and the loss of working days, all of which in a real sense are the liabilities of the nation. These have to be sustained without any value received. In 1912 the public paid for 269,210 working days in the British Navy, in which no work was done, owing to venereal disease, and in addition paid for skilled medical treatment and costly drugs. In the Presbyterian Hospital, New York, in 1911-12 there were 46 cases, representing 961 days lost.

Similar tables taken from other hospitals indicate a total of 1,122 cases, representing 22,505 days lost, at an average of about three weeks per patient. Financially it runs into millions per annum. In evidence given before the Royal Commission on Venereal Diseases it was stated there must be 3,000,000 syphilitics in the United Kingdom, and this was a prewar figure, certainly greatly increased at the present time. Do they cost less than £1 per head per year with their treatment, either at public or private expense? And probably three times as much is spent on gonorrhea. Such expense would go a long way toward paying the interest on war loans. (A. H. E.)

TILNEY, F. *The future of medicine in the United States.* Columbia University Quarterly, October, 1918.

The author believes that the future of medicine in the United States is indeed bright and gives several reasons why this country is a most fitting place for the future center of medicine.

The entire effort of every European State must be concentrated upon the rehabilitation of the essentials of life. The higher pursuits of civilization must for a time at least stand aside, or bend their energy to the simpler purpose. The security and plenty upon which German medical science grew to be the commanding figure in the world of medicine have gone. Not for a long time will the Germanic capitals be the center of medical learning which they have been in the past. This distinction must pass into other keeping.

France, henceforth the symbol of heroic sacrifice and salvation, has given nearly all she had, and being impoverished by the noble gift needs time to replenish her resources.

England, the bulwark of civilization throughout the struggle, has stripped her empire, and for years to come will be handicapped in maintaining and advancing science. This is particularly true in medical science; for Great Britain early in the war encouraged the mobilization of the entire medical profession and permitted medical students to serve with the colors, in this way depriving herself of a large annual increment to the medical ranks. Whatever handicaps we may labor under, due to our present or future sacrifices, we shall inevitably occupy the point of vantage in this regard as well as a position of responsibility.

The country no longer regards medicine merely as a learned profession, but is coming to consider it one of the essential industries. Sound public health is a necessary element in the will to victory. The civil population unduly enfeebled by disease or discouraged by neglect can not be expected to support a winning army. All signs give assurance

that the Government in its wisdom will provide adequate medical attention for the people, prevent relaxation in the safeguards against epidemics, and restrict the spread of disease to the limits normal in peace times. In another critical relation the efforts of the medical profession have become indispensable to final success.

Alive to the significance of our position, we recognize that American medicine can no longer be an overseas province on the medical map. We are ready to make it what it should be. Our tradition leads us to feel that we shall succeed. Our practical instinct compels us, however, to take stock of our qualifications. As to one of our assets there can be no dispute. American medicine is supreme in surgery. In this most direct practical handicraft of the healing arts it is probable we have no equals. American surgery has won its repute not alone for its ingenuity and sound adherence to fundamental principles, but quite as much through the brilliancy of its technic and enterprise. It has produced a surprisingly large number of surgeons noted for their exceptional skill in general and highly special regional procedure. The number of these is still growing. In fact, no other country possesses so many thoroughly trained surgeons who may be considered competent to assume the responsibilities of major operative work.

Another valuable factor ready to our hand is the diagnostic clinic, or group ideas in diagnosis and practice. This is essentially an American conception, and its successful application as a scientific method for the practice of medicine is an accomplishment in which we have a just national pride.

In the matter of equipment we are rapidly increasing the number of modern hospitals throughout the country. These institutions have the advantage of modern management, which conceives of the hospital as an educational factor as well as a place to care for the sick. The idea is becoming more generally accepted that a hospital, especially in large centers, which has no teaching facilities does not discharge its full duties to the public.

Medical research has had an unprecedented growth in recent times, as evidenced by the development of special institutions for the intensive study of the human body and its diseases. Notable among these are institutes for the investigation of cancer, tuberculosis, mental disorders, the development of the body, the anatomy of the brain, and general experimental medicine. In connection with these institutes the opportunities for postgraduate teaching have been much enhanced.

We must not, however, neglect the other side of the question. We have our defects. The most obvious of these, perhaps, is that we have permitted our vision to become nearsighted and locally introspective. Because of this limited view, we have gained no sense of the possibili

ties and proportion of our mission; it would even seem that we had no realization of a mission at all. Our natural impetuosity, our desire for quick results have made us intolerant of delay and often hasty where patience is more needed as a commodity than as a virtue. We have had too little esteem for our own achievements and an overweening regard for foreign work, especially of German stamp. This is all the more discomfiting since the quality of German production has fallen off in the past 15 or 20 years.

Preventive medicine particularly is destined to undergo much expansion. To its many present activities others equally necessary will be added. Among these might be mentioned the need of medical registration for the detection of disease in its incipience. Those connected with draft-exemption boards have been astonished at inroads into possible military effectives made by preventable diseases or disorders curable in early life.

Industrial medicine will soon have a field of its own. The health of operatives is calculated as an essential of efficiency, and medical departments have already been installed in a number of large corporations.

Public mental hygiene is an urgent national problem which must engage medical attention more seriously in the future. The significance of insanity as an economic loss will be realized by the fact that one-third of the entire budget of New York State is annually appropriated for the care of the insane. Feeble-mindedness as a burden to the community has assumed such proportions as to necessitate the appointment of a special commission for its management in this State. The Government attaches such importance to this problem that it has called one of the most distinguished physicians of this country to the chairmanship of the committee.

The necessity of medical cooperation in court and prison matters has become apparent. To distinguish between the feeble-minded, a psychopathic delinquent on the one hand, and the criminal on the other, to differentiate between the necessity of therapeutic and of punitive measures in each case, and to study the pathological factors in the development of the criminal are necessary functions of the State.

If the country is to avail itself of the obvious advantages of universal military training after the war, military medicine must be still further developed in the colleges. It seems advisable that permanent courses in military medicine be introduced into the curriculum of medical schools.

The obligation of the medical profession is clear, and some portion of it rests on each one of us. The materials are ready and only await assembling for the creation of a new Mecca of medicine.
(W. A. B.)

MENTAL AND NERVOUS DISEASES.

LICHTENSTEIN, P. M. *The criminal.* Med. Rec., New York, March 12, 1921.

The following etiologic factors were found present in criminals in New York City: Drug addicts, 20 per cent; mental defectives, 20 per cent; insane, 1 to 2 per cent; while the remaining 58 or 59 per cent were composed of prisoners whose criminal record and tendency may be traced directly to environment, opportunity and temptation, and finally to heredity. From the standpoint of prevention of crime it seems apparent that the strict administration of proper laws in regard to habit-forming drugs would promptly reduce the commission of crimes approximately 20 per cent. In regard to mental defectives the problem is less simple. The mental defective is a potential criminal. He is easily led, is susceptible to suggestion, and seems to assimilate all that is bad and to reject all that is good. He thinks after he acts instead of before, he lacks judgment and is thus easily made the tool of his associates. Everyone can not be subjected to a mental test. At present only those who are arrested are discovered. It seems best that these should receive some form of institutional treatment. Those in particular who have shown clear criminal traits should be kept in an institution for the period of their natural life. For the higher types of mental defectives much can be done in the way of properly placed and properly planned education. They are not benefited by prison life. For many this becomes a school of further crime.

As to the prevention of crime by the insane, much might be accomplished if, once diagnosed, they were never given an opportunity to commit crime. Many crimes are committed by the so-called case that has "cleared up" and is allowed to go at large. This is particularly true of individuals suffering from delusions of persecution. In probably 90 per cent of these "cleared up" cases remissions occur and often it is in the form of a crime. Even in the case of those who do not suffer from delusions the judgment is impaired and a crime is often committed. Institutional treatment is the only adequate remedy and should include not only the insane and the mental defective, but also the moral defective. He also is a potential criminal.

In eliminating the gambling den, the resort of the gangster, the pool room, and social club, cheap dance halls, and opportunities for contracting venereal disease, much can be done toward the prevention of crime due to environment, opportunity, and temptation. Heredity is a large factor difficult of control, but none the less eminent. (A. H. E.)

GURD, A. E. The structural brain lesions of dementia præcox. Am. Jour. Insan., October, 1920.

In a cursory review of the literature the author finds that essential organic changes have been noted in the central nervous system of dementia præcox cases by skilled observers, at least since 1897, when Alzheimer noted severe changes in the ganglion cells, with tendency to disorganization, sparing mitoses in the glia, pathological formation of glia fibers with encircling of nerve cells by these fibers, much swelling of the nuclei of the nerve cells, marked folding of the nuclear membrane, and severe shrinking of the bodies of the ganglion cells. Others noted various changes such as abnormalities of Nissl's granules, disappearance of the dendrites, general degeneration of the nerve cells with increase of fat, thinning of the cell layers, and severe sclerosis of the ganglion cells.

The writer reports the results of the study of the histo-pathology of 19 cases of unquestioned dementia præcox. A few words regarding the clinical and family history of each case is given. The gross macroscopic lesions noted were as follows: Evident atrophy was seen in 8 cases, while 5 cases showed neither atrophy nor agenesis. None of the brain weights were excessive in comparison with the size and weight of the body, but there seemed to be a relation between the weight and the duration of the disease and the age of the patient. For instance, a case of acute catatonia in a woman of 21 years gave a brain weight of 1,350 grams; whereas another case with a duration of 45 years and death at age of 75 years gave a brain weight of 1,090 grams. The proportions seemed approximately the same for men. Inequality in the convolutions of one hemisphere of the brain as compared to the other, and irregularity of the anterior central convolutions and of the left parietal lobe was noted in some cases. In others there were irregular and stellate depressions at the junction of the sulci. Some showed very small and thin cranial nerves, and others extremely small basal blood vessels.

Microscopically the cases seem to fall into three groups, each progressing into the other in the degree of severity of the lesions found and bearing this relation directly, generally speaking, to the duration and chronicity of the disease condition. In the acute catatonic type, cases having lasted but a few months (the first group), a paleness of the field is seen, with loss of chromatin in the nerve cells, granular degeneration of the cell body and the dendrites, marked alterations in the nucleus, with folding and irregularity of the nuclear membrane and metachromic alteration of the nucleoli, severe fatty degeneration of glia and nerve cells, with many re-

gressive changes in glia cells and very few progressive glia changes. In two cases of longer standing, from two to four years (forming the second group), there were found in addition to these changes a good many shrunken and sclerosed cells, especially in the medium pyramidal cells, and considerable increase in the number of cells undergoing severe Nissl's degeneration. The long-standing cases, with a history of psychosis from 10 to 35 years (forming the third group), show still more advanced and chronic types of degeneration along the described lines. There is an irregular appearance to the cell layers, the ganglion cells seem thinned out, and separate ganglion cells frequently show great irregularity in the direction of their principal axis, often lying diagonally and sometimes transversely to the surface. The whole body of practically every nerve cell is broken up into a coarsely metachromatic granular mass and the dendrites have undergone the same changes. Great numbers of the smaller pyramidal cells in addition to this granular condition are sclerosed and many of the larger pyramidal cells are completely fragmented or merely a mass of vacuoles.

On consideration of these organic changes dementia præcox presents itself to the author as a disease with special localization in the central nervous system, causing continuous or intermittent degenerative changes corresponding with improvement or remission of the clinical disease. (A. H. E.)

BOND, E. D. A review of the five-year period following admission in one hundred and eleven mental patients. *Am. Jour. Insan.*, January, 1921.

The histories of all the 111 women admitted to the department for mental and nervous diseases of the Pennsylvania Hospital, for the hospital year 1914, were traced for the succeeding 5-year period, and the results are shown on charts which are well amplified in the text of the article.

As to hospital residence, 6 patients still remained in the hospital under treatment; 10 patients average $4\frac{1}{2}$ years; 101 patients average 6 months; they all average 11 months. More time units were spent on 11 patients than on the remaining 100; and 47 were in the hospital less than 3 months, in contrast to the general opinion that the average residence is several years. As to complete recoveries, 28 remained well from 2 to 5 years, and although in total 23 years were wasted they had won back 110 years of normal living. Of the 27 in the second group, 11 have had relapses as bad as the original attack and the remainder are inadaptable, living at home, working at times. Of the 56 remaining, 23 have died, 22 are in other hospitals, 5 are unimproved at home, and 6 are still in the hospital of original admission. In all there were 26 deaths, usually from known causes.

From a standpoint of diagnosis, all but one of 20 cases of dementia præcox were still under hospital care. Two had been out from under treatment for a short time, and the one case mentioned was maintaining herself precariously, improved but having no disease in sight and retaining delusions. In the manic-depressive group of 41 there were 20 recoveries, 8 with no sign of improvement and 13 with incomplete recoveries, ranging from a woman with one or two attacks a year to one who after a period of moderate usefulness with irritability lapsed into an attack lasting $3\frac{1}{2}$ years. Death was the indicated outcome in the senile-arteriosclerotic group, as 10 patients with this type of dementia when admitted had an average age of 76 years. Of these, two were still alive. Seven cases of psychosis with various forms of somatic disease showed 4 deaths, 1 recovery, and 2 partial recoveries. The balance fall into "unclassified" grouping, in which 7 have died, 7 are still under treatment, 10 are recovered, and 8 are partially recovered. (A. H. E.)

SURGERY.

HAMMOND, L. J. *Acute traumatic surgery of the abdomen.* Penna. Med. Jour., Vol. XXIV, No. 5, February, 1921.

Every injury to the abdomen, however slight it may appear at the time, should be treated as though grave, for unexpected symptoms may arise and death ensue from apparently slight blows. On the other hand, injuries apparently severe may be neither attended nor followed by serious results. In the interest of the patient we must be suspicious of the worst when injuries to this region occur.

About 10 per cent of the serious injuries to the body are to the abdominal viscera. The surface of the abdomen, because of its elasticity and yielding, may escape serious effect from a sudden smart blow that will contuse or rupture the organs within. This is especially true of such solid organs as the liver, spleen, and kidney. The stomach, urinary bladder, gall-bladder, if distended with fluid, may be ruptured by a blow or fall that would not injure the intestines unless the force of the blow is directed so as to press them against the vertebræ or the bones of the pelvis.

The immediate and serious effect of these concealed injuries is hemorrhage and rupture of the hollow viscera with discharge of infectious material into the cavity of the peritoneum. Severe and prolonged shock may immediately follow in the absence of hemorrhage, but if it is prolonged and anemia increases, with growing weakness of the pulse and restlessness, hemorrhage should be suspected. Pain, rigidity of the abdominal muscles, nausea, vomiting, and hiccough

(which suggests peritonitis from escape of abdominal contents) are not present until at least 12 hours after the injury.

It is more difficult to decide upon the actual extent of injury to the viscera without wounds of the abdominal wall than when such exist. If, however, the degree of shock is great and the general condition does not improve and the injury of other parts will not explain the lack of improvement, it must be assumed that there is grave intraabdominal injury. Median laparotomy, if the condition of the patient warrants such a step, is the only sure means of ascertaining this fact, and the more quickly it is performed the more favorable will be the result.

The most misleading of the visceral lesions are those where a grave injury exists, yet shock is transient and followed by a period of comparative ease. Such a patient should be closely observed and the abdomen promptly opened if vomiting of bile or blood-stained material, muscle rigidity, and irregular distention develop. To disregard these signs for later and more positive evidence of peritonitis allows the most favorable opportunity for operation and repair of the injury to pass. (L. W. J.)

GIBSON, C. L. Rubber dam Mikulicz tampon. *Ann. Surg.*, Vol. LXXIII, No. 4, April, 1921, page 470.

A square of rubber dam of suitable size, say 20 by 20 inches in the case of a large retrocecal abscess, is folded two or three times in the form of a cornucopia. The apex is snipped off, making the hole the size of the tip of the little finger. An inch and a half above this the edges of the cornucopia are cut again, making a perforation about one-half inch in size. Another row of perforations may be made higher up.

After the appendix has been removed and all the purulent material sponged out, the tampon is carried into the cavity, the index finger being placed at its apex. The edges of the rubber dam are spread out and while the operator still keeps his finger in the apex the tampon is filled with strips of gauze. Overstuff the cavity in order to push the omentum and gut well away from the incision. A large loose dressing is applied. At the end of 24 hours change the outer dressing. At the end of 48 hours remove all the gauze. The tampon may be removed then or else gauze reintroduced. At the end of 72 hours remove the entire tampon.

The abdominal contents are thus permanently pushed back from the wound cavity and there is a well-defined, walled-off cavity which can be drained with great ease. The Carrell-Dakin treatment can now be instituted under ideal conditions. (L. W. J.)

ESTES, JR., W. L. **Early diagnosis of perforated gastric or duodenal ulcer.** Penna. Med. Jour., Vol. XXIV, No. 5, February, 1921, page 307.

Successful treatment of perforation of a gastric or duodenal ulcer depends on early surgical intervention. In the first 12 hours, operation offers the patient a fairly certain cure.

The predominant and characteristic symptom is pain of sudden onset, intense, severe, and agonizing. It is usually constant and continuous, and only very slight relief is afforded by morphia.

Vomiting is inconstant, unimportant, but usually present. There is no specific character to the vomitus.

The patient has an anxious, fearful expression; he holds himself rigid, as motion increases the pain; respiration is entirely thoracic; the abdomen is scaphoid to the point of retraction, especially in the upper half, producing a transverse furrow completely across the abdomen just above the umbilicus. This appearance is most characteristic and is one of the distinguishing features of a perforated ulcer.

There is little evidence of shock, the pulse is of good volume and only slightly accelerated. There is no characteristic leukocyte finding.

Transverse abdominal retraction is the most striking and characteristic feature and is never so emphasized in any other acute abdominal lesion. (L. W. J.)

BOLAND, F. K. **Postoperative thrombophlebitis.** South. Med. Jour., Vol. XIV, No. 4, April, 1921, page 307.

To have veins infected from a septic field, as phlegmasia alba dolens accompanies puerperal sepsis, can not be surprising; but to see the condition follow a clean operation faultlessly performed is something difficult to explain. Various writers report an incidence of 1 to 4 per cent in clean operations.

The onset is from four days to four weeks after operation. Almost any vein in the body may be affected, but those of the lower extremity most frequently, and the left leg three times as often as the right.

Some writers believe that none of the patients who develop thrombophlebitis has an absolutely normal convalescence up to the time the complication is recognized. There is frequently a low, irregular, persistent pyrexia from the time of the operation until the onset of local symptoms. It has been stated that in patients who have a perfectly normal temperature curve after operation, thrombophlebitis and embolism need not be feared, but Estes records two cases of normal temperature up to the time of development of local symptoms.

Trauma is mentioned as a frequent cause, but it has not been possible to produce the condition by trauma in experiments on animals. Varicose veins are considered an important predisposing cause. The best treatment of phlebitis is not to have it. Incidence of the disease may be reduced by sharp, clean dissection, gentle handling of tissues and perfect aseptic technic. (L. W. J.)

HERTZLER, A. E. Pin method for approximation of the fragments in fractured patella. Surg., Gynec. and Obstet., Vol. XXXII, No. 3, March, 1921, page 273.

Steel pins, about 6 inches long, are passed through the tendons, one above the upper fragment and one below the lower fragment. The pins are then approximated until the fragments are in proper position and the pins fixed together by adhesive or bandages. No other dressing is required.

By this method the fragments can be certainly approximated without entering the joint. It can be used in the absence of the facilities that are essential for an open operation. (L. W. J.)

STEPHENS, R. Tibial tubercle affections. Ann. Surg., Vol. LXXII, No. 1, January, 1921.

The author reports a series of cases of this lesion, all of which occurred in youths except one.

The cause has not been definitely ascertained but is, in all probability, injury either from a direct blow to the tubercle of the tibia or from strong contraction of the quadriceps femoris muscle. The injury may be too slight to be recorded or may be from frequently repeated mild blows or strains. There was nothing in any of the cases to suggest local disease or infection, but there is always some inflammatory reaction as in cases of traumatic periostitis. Wassermann negative.

Practically the same symptoms were obtained from all the cases, i. e.: Some impairment of gait, slight pain and tender swelling just below the knee. Pain is increased by active exercise. In the majority of the cases roentgenograms showed a condition which might be interpreted to be a periosteal tear or a separation of a center of ossification. One of the cases showed the tubercle as a separate body apparently not attached to the tibia.

Treatment is the same for all cases—rest, protection, and fixation by adhesive plaster or plaster cast. Under treatment the duration is short and the prognosis very good. (J. J. S.)

HYGIENE AND SANITATION.

CHAPLIN, A. **Preserving health of seamen aboard ship.** Proc. Roy. Soc. Med., February, 1921.

This article is reviewed for two reasons. American medical periodicals rarely contain any allusion to the health of the seafaring class, but if we are to have again an American merchant marine the medical profession, both civilian and naval, must interest itself in the health concerns thereof. It is interesting for members of the naval service to get some insight into the conditions that prevail among merchant seamen.

To conceive that the hygiene of a ship can be considered in the same terms as the hygiene of shore dwellers is to invite disaster. The structure of the various subdivisions and compartments of a ship is a compromise. The full requirements of cargo, engines, passengers, etc., impinge on each other. Another popular mistake is the notion that fresh air abounds aboard ship. Again it is an error to believe that an unusual amount of sickness prevails among seamen. Reports of mortality in the British merchant marine are uncertain guides: "Less than 600 ships on the British Register out of some 10,000 are obliged to carry a surgeon." To obtain reliable data the mortality returns for ships carrying a qualified medical man should be in a separate category from the reports of those which do not.

"A rough but fairly accurate method of estimating the health of a ship's crew consists in finding the proportion of sick days to the total number of crew days run on a voyage." The author found the proportion of sick days to working days as 1 to 300 in his observations covering 15 years. Taking that as a normal index of sickness, if it rises noticeably on a given ship investigation is indicated. "For the purpose of a more detailed study of the incidence of disease on board ship, I have, for the past 18 years, compiled returns of the mortality and sickness occurring in the companies I have the honor to advise."

Nearly a quarter of a million seamen were employed in the mercantile marine in 1912, of which 45,000 were lascars. The rate of mortality on steamships for disease was 3.5 per thousand for European or white seamen and 5.4 per thousand for lascars or natives. The mortality has slightly improved for the last 12 years. The mortality rates are better than the rate for those of the same ages employed in industrial work, but not so good as that obtained in the Royal Navy in times of peace. In the companies to which Dr. Chaplin has been adviser the annual mortality rate for 16 years averaged 2.6 per thousand for Europeans and 4.2 per thousand for natives. A favorable influence on mortality is exerted by the better

living conditions and the more rigid method of selecting men which prevail in the larger companies. In the figures quoted only officers and men who have served one year or more are included.

"When disease of any kind breaks out on board ship it is much more liable to spread and is much more difficult to control than on land." The largest outbreaks, as might be expected, are those communicated by the air passages. Influenza, for instance, spreads at an alarming rate and converts a ship into a hospital. "On the other hand, given a ship's company free from infective conditions, there are few places in the world where the health of a community is so good."

In ships whose routes include the eastern Tropics, Chaplain finds the commonest diseases to be: Pneumonia, phthisis, heart disease, heat effects, beriberi, typhoid fever, malaria, plague, mumps, chicken pox, measles, dysentery, and influenza. Pneumonia, especially in natives, is one of the most dangerous diseases met with aboard ship. Chaplin finds the mortality 0.3 per thousand in Europeans, 0.8 per thousand natives employed, and 12.8 per cent among Europeans attacked and 35 per cent among natives attacked. Of plague patients 50 per cent among natives and 28 per cent among Europeans die. It is interesting to note that the lascar in cold latitudes hardly ever consents to wear warmer clothing, no matter how abundantly it is provided.

Chaplin found 2 per thousand the incidence of tuberculosis, and 0.14 per thousand the mortality for Europeans employed, with 1 per cent mortality for cases. The figures for natives are much higher—5 per thousand are attacked, yielding a mortality of 0.47 per thousand, and the percentage of deaths to cases is 10. Unceasing efforts along the lines of isolation and disinfection have produced no sensible diminution of this complaint, and climate seems to have little bearing on the subject.

In tropical service the effects of heat are noteworthy. Among Europeans heat apoplexy affected 0.35 per thousand, with 8 per cent case mortality. Among natives the figures were 0.16 and 0.22, respectively. The essence of successful treatment in these cases is despatch and thoroughness.

Chaplin finds the quality of the milling of rice the determining factor in causation of ship beriberi. It was hard to obtain the "undermilled" variety during the war and beriberi reappeared. Chaplin holds that venereal disease is not nearly so prevalent among seamen as commonly supposed and says that "the sailor with all the temptations attendant upon his calling is not much more liable to venereal disease than people on shore."

The first step toward securing health and increased efficiency in the merchant marine is to have a systematized general scheme of

physical examination to be enforced before men "sign on" for a voyage. The next step covers the vast subject of ship sanitation, which includes considerations of space, light, air, food, and water. (For American ships add heating.)

The merchant shipping act demands that the crew be allotted 120 cubic feet per person, such space to include 15 superficial feet, with a minimum of 72 cubic feet after deducting for furniture and bunks. In discussing the desirability of more space the author points out the complicated nature of the question for passenger ships.

In speaking of ship disinfection it is noted that lately "a regulation has come into force by which all ships must be fumigated at regular intervals," which in principle is wise.

The subject of medical accommodation on board is introduced with this striking statement:

"The old idea concerning the surgeon and his accommodation was crude in the extreme. He was regarded almost with suspicion, as a necessary evil forced by law on an unwilling company. His pay was low, and it was only too evident that the men who could be attracted by such meager remuneration were, to say the least, not the leaders of their profession. He had, it is true, a cabin, and sometimes a dispensary, but more often he had to be content with a medicine chest not unlike that described by Woodall in his "Surgion's Mate," published in the year 1639, and in some corner of an alleyway he performed his duty as a compounder of drugs. Now, however, all that is changed. The medical men who follow their profession on board ship form a fine and able class of men, and the accommodation afforded them is, as a rule, all that can be desired.

"The surgeon requires for the proper performance of his duties on board ship a cabin for himself, a surgery, hospital cabins, and isolation cabins. With any of these lacking he can not be expected to do his duty satisfactorily as a medical man on board ship. The merchant shipping act states that every ship carrying 100 persons or more must carry a surgeon, and about 600 ships on the British Register out of a total of about 10,000 fall under this definition."

The author urges that "a type of hospital cabin be considered and adopted for the passenger mail boat, the intermediate passenger boat, and the cargo boat. Armed with these stereotyped plans the naval architect would know what was required, and the necessity would never arise of reconstructing and altering after the ship has been built, with the attendant excessive cost of such a proceeding."

* * *

"In determining the position of the isolation cabins a choice has to be made between the comfort of the patient and the safety from infection of the rest of the ship's community. In any case the isola-

tion cabin must be placed on the uppermost deck, for the laws of hygiene would be violated if any other place were chosen.

"If the comfort of the patient be first considered, the best place for the isolation cabins is on the uppermost deck as near amidships as is possible, but if the safety from infection of the rest of the ship's company be the main consideration, then the only place for the isolation cabin is on the uppermost deck, as far aft as possible, with all the attendant discomforts produced by the motion of the ship and the vibration of the screw. I have had experience of both plans, but after reflection I have abandoned the considerations of the comfort of the patient and have thought only of the safety of the ship's community.

"In the case of the large passenger liner, where there is ample space, the isolation cabins can be built in the stern on a small raised deck with access by means of a short staircase. The cabins are thus completely shut off from the rest of the ship. The isolation cabins and the rest of the accommodation are divided longitudinally by a bulkhead passing down the center, and each side of the bulkhead is partitioned off into one or more isolation cabins placed forward. The door of the isolation cabin opens on to an alleyway, and on the other side of the alleyway are doors opening into the attendant's cabin, the bathroom, and the lavatory. On the other side of the bulkhead similar arrangements are found, the intention being to have one side reserved for females and the other for males. The door giving entrance to the alleyway has a ventilator above it, and so also have the doors of the bathroom and the lavatory. By this method a free current of air is secured in the alleyway. The isolation cabins themselves have ample means of ventilation through wide scuttles, and, if necessary, ventilators in the roof.

"The size of the cabins should be 12 by 12 feet and 8 feet high, and four people could be accommodated. This gives 240 cubic feet per person, a cubic content I regard as sufficient when it is remembered that the ventilation is rapid, the cabins rarely full, and the situation open. It is true that 2,000 cubic feet per bed is the allowance for an infectious case on land, but it will be remembered that we are dealing with limited space on board ship.

"The material of which the cabins should be constructed is also important. In order to make a strong job, iron has often been used, but the result has not been a success, for iron, on account of its property of conducting heat and cold, renders it unsuitable as material for hospital construction. If it must be used, the inside must be lined with some nonconducting material. On the whole, wood appears to be the most suitable material for this purpose, and it is well

to have a double roof, or an awning. Radiators are, of course, necessary, and scuttles of ample size.

"In a medium-sized mail steamer, where space is more limited, a slightly different plan may be adopted; and a saving of space may be effected by having only one attendant's cabin and by placing the lavatory in the bathroom. As in the previous plan, the isolation cabin is separated from the attendant's cabin and the bathroom by a cross alleyway, which is ventilated at each end.

"Where it is impossible, on account of limited space, to place isolation cabins on a deck apart from the rest of the ship, a barrier should be placed across the deck so as to prevent access to that part of the deck."

In the case of the small intermediate steamer, with not more than 350 persons (crew and passengers) aboard, "there is no necessity to provide large isolation accommodation. The best, indeed the only, situation for the isolation cabins on this class of ship is on the roof of the house occupied by the steam steering gear. In building these cabins sacrifices have to be made by leaving out of the plan an attendant's cabin. Here the hospital is entered through a vestibule which is ventilated, and the isolation cabin, the bathroom, and the lavatory open out of this vestibule." * * *

"We now pass to the consideration of the surgeon's cabin, the dispensary, and the hospital cabins. If isolation cabins must be placed on the uppermost deck, it is clearly undesirable, and often impossible, to build the ordinary hospital cabins contiguous to those structures. A compromise may be effected by placing the hospital cabin on the spar deck aft, a good situation being the after end of the starboard alleyway, looking out on to what was once the well deck. It is advantageous to have the surgery and hospital cabins in close proximity to the surgeon's cabin."

In the discussion that followed the reading of the above paper at the meeting of the Section of Epidemiology and State Medicine, "Maj. Gen. Sir William Macpherson said that he had had much to do with the health of troops on board ship during many years, and more than 20 years ago he had brought to the notice of the War Office and Admiralty the high incidence of pneumonia and deaths from pneumonia on board transports. The pneumonia mortality was estimated at that time at about three times greater than the pneumonia mortality amongst troops on land. He had specially emphasized the necessity of a better means of ventilating the troop decks, which, as Dr. Chaplin probably knew, were often on the lower and cargo decks of ships, and therefore below water level. He had had an opportunity in 1908 of making a voyage on one of the trans-

ports of the United States Army with the special object of studying the method adopted by the United States Army of ventilating troop decks. There was a small deck house with a propulsion engine for the purpose of propelling fresh sea air through tubes into every part of the lower decks, and the air in these decks was as fresh as on the open decks above. There was an arrangement by which the air propelled into these decks was warmed over radiators when the transport was in a cold climate and cooled over ice when in a hot climate." (J. S. T.)

NOTES AND COMMENTS.

Errata.—Issue of April, 1921, in the footnote, page 291, read “San Diego” for “San Pedro.” Illustration opposite page 400, read “necrosis” for “incision.” Illustration 400-3, figure 4, read “formation” for “pronation.” Apologies tendered.

On August 31, 1921, a hundred years will have rolled by since the birth of Hermann L. F. von Helmholtz, who at the age of 30, invented the ophthalmoscope. Through his mother Helmholtz was a direct descendent of William Penn. In obedience to a direct order from the kaiser, but rather against his own inclinations, von Helmholtz attended, as president, the International Electrical Congress held in connection with the Columbian Exposition at Chicago in 1893. The emperor in a personal interview expatiated to Von Helmholtz on the wonderful industrial and artistic productions which Germany was shipping to the American exposition, but insisted that as it was more important still to show the men the country raised Helmholtz must go as its best representative. Speaking of the incident Helmholtz's wife remarked: “And yet Helmholtz is pushed off the sidewalk in Berlin almost every day by any little lieutenant in the army who happens to be passing!”

In respect to the manners of little lieutenants *tutto il mondo è paese*.

The November-December, 1920, issue of *Annali di Medicina Navale e Coloniale*, one of the best service periodicals published, contains a glowing editorial tribute to the professional attainments and career of Filippo Rho, lieutenant general, Royal Italian Navy (ret.), who has recently completed 40 years of distinguished service in his country's employ and was for many years at the head of the medical corps. The editor of the *Annali* notes with pride that of some 125 important contributions to the medical literature of the world made by Dr. Rho the majority were published in service magazines, first in the joint publication of the two services and then in the Navy's own quarterly. Surgeon General Rho has been one of the leading medical authorities in Italy, particularly along the lines of hygiene, preventive and

tropical medicine. It is owing to his efforts that antityphoid inoculation was introduced in the Italian Navy. During the World War, Rho's success in the use of malarial prophylaxis kept the disease incidence of malaria in the naval brigade on the Lower Piave down to 9 per cent, a figure incomparably lower than that which held for the army forces.

Rho effected a great reduction in Government expenditures by his reform of the navy ration, based on scientific studies of protein requirements. At a much earlier period in his naval career Rho argued convincingly against the concentration of personnel and material in a single battle dressing station aboard ship.

Rho was one of the early opponents of the theory of hereditary transmission of tuberculosis. These random references are far from covering the field of Dr. Rho's endeavor. He has been concerned with all phases of life and all aspects of the medical profession and by his learning, culture, and arduous toil has exercised a powerful influence for good both in naval and civil life.

W. C. Rivers, M. R. C. S., D. P. H., tuberculosis officer for Barnsley district, West Riding, Yorkshire, writing in the *British Medical Journal*, January 22, 1921, attaches great diagnostic importance to the drooping shoulder on the involved side, or the side most or longest affected, in pulmonary tuberculosis. The point of the shoulder is depressed and the nipple at a lower level than on the sound side. The nipple is also smaller and lies farther back. These phenomena were observed by Rivers in 50 per cent of his last 50 consecutive cases of phthisis. Posteriorly, the inferior angle of the scapula may be seen as much as 3 inches lower than its fellow and it is in a different relation to the vertebral column—usually nearer. Muscular atrophy is observed in the pectoral muscles, but more markedly in the trapezius. The superior border of that muscle is flattened, wasted, and hollowed out. While the sign occurs in men and women alike it is more marked in men. It may develop in the course of a few weeks or characterize second and third-stage cases.

J. C. Lyth, M. B., B. S. Lond., writing in the *British Medical Journal*, February 19, 1921, reports curing hemorrhoids without operation. He holds that the distinction between internal and external hemorrhoids is a minor one. The internal hemorrhoid, which remains internal does little harm, but once it begins to protrude at evacuations pain and discomfort result from compression by the sphincter. Lyth is careful to say that he is speaking clinically and

medically. The expense, trouble, and pain of an operation and the unpleasant results that may attend dilatation of the sphincter justify an attempt to cure without operation.

The suggestion offered is simple and would seem to deserve a trial, at least in the cases where some special reason may exist to make operation undesirable, as in the aged or feeble and in mild cases. The first thing is to change the patient's habits. The daily evacuation must be secured at night instead of in the morning hours, so that the pain and irritation caused thereby may be followed by 7 or 8 hours of rest in bed. Suitable aperients and regimen to this end must be prescribed. The movements secured must not be too loose. The essential is the daily motion at night. This is followed by sponging the parts with warm water. Then calamine (zinc carbonate)—as much as two teaspoonfuls—is thickly powdered on a sanitary wool or gauze pad applied against the hemorrhoids by tapes secured to the waist. The dressing may require to be renewed in the morning if there is much discharge; or a calamine ointment may be used during the day. This treatment reduces the sensitiveness of the prolapsed hemorrhoids and the regular rest in the recumbent posture after their prolapse favors their return. After two or three weeks of this treatment the pad may be dispensed with. The essential thereafter is the nocturnal evacuation.

The method appears rational.

May Tevis in the *Scientific American Monthly* (February, 1921) discusses the use of the X-ray for determining the authenticity of old paintings. The first work along these lines was done in Germany and Holland, but the most definite and remarkable results are due to a French expert. Three features of a painting determine its susceptibility to authentication by the X-ray. These are: (1) The surface to which pigments were applied, as wood, canvas, leather, silk, ivory; (2) the nature of the sizing employed; (3) the pigments used. Wood and canvas are permeable to X-rays, especially wood. Canvas varies in this respect with the number of meshes. In former times sizing was made of carbonate of lime mixed with glue, which was far more transparent to X-rays than the sizing now employed—mainly white lead. The ancients made their colors almost entirely from mineral substances. To-day aniline colors and many derived from vegetable sources are used. The extremes of permeability to the X-ray are represented by the heavy salts of lead and zinc, both now and formerly used for white and bitumen used for black pigment. The earlier red shades were almost wholly derived from mineral sources. They are now very largely vegetable, e. g., madder.

In a word, the ancient pigment was opaque and the sizing relatively transparent. Just the reverse holds for the modern pigment and sizing. We are thus able to see through to the original surface. Retouching, restorations, or complete superimposition of one design upon another can be detected by the expert. The article is strikingly illustrated.

The New York Industrial Code requires that "in every factory employing more than 10 persons, in which power-driven machinery is used for manufacturing, there shall be provided a first-aid kit at all times, free of expense to employees," and that "in every establishment where a first-aid kit is to be maintained, at least one person shall be instructed by a physician or trained nurse how to apply first aid to injured persons and shall have charge of the first-aid kit and its maintenance.

Under the auspices of the Eyesight Conservation Council, of which L. W. Wallace (Pres. Am. Soc. Industrial Engineers) is president and Cassius D. Wescott, M. D., vice president, a concentrated effort will be begun shortly to spread information on the preservation of eyesight, etc. The movement will be financed in part by firms in the optical industry.

Dr. P. Roth, in the Boston Medical and Surgical Journal for March 3, 1921, gives a valuable list of references to current periodical literature covering the subject of basal metabolism estimation. He states that the first laboratory for the clinical study of basal metabolism was established by him at the Battle Creek institution in 1913 through the assistance and cooperation of Dr. F. G. Benedict, of the Nutritional Laboratory of the Carnegie Institution. The Benedict portable apparatus for estimating basal metabolism may be purchased of W. E. Collins, 584 Huntington avenue, Boston 17, Mass.

The American Society of Tropical Medicine has 108 active members, 19 corresponding members, and 29 honorary members. The present Surgeon General of the Navy, Rear Admiral E. R. Stitt, Medical Corps, United States Navy, was at one time president of this association. The society has recently issued the first number of its official organ, The American Journal of Tropical Medicine. The professional articles therein contained are:

Medical notes on the Dominican Republic and Haiti. John M. Swan.

An attempt to explain the greater pathogenicity of *Plasmodium falciparum* as compared with other species. C. C. Bass.

Natural malaria infection in *Anopheles* mosquitoes. W. V. King.

On the prevalence of carriers of *Endamoeba dysenteriae* among soldiers returned from overseas service. Charles Atwood Kofoed and Olive Swezy.

Study of a case of yaws, contracted by an American soldier in France. Jay Frank Schamberg and Joseph Victor Klauder.

Report of a case of bacillary dysentery with diphtheritic membrane in the vagina and edema of the abdominal wall. I. I. Lemann.

The first microbiological laboratory in the Far East was founded in 1891 by A. Calmette in connection with the military hospital at Saïgon, and this was merged into the Pasteur Institute established by A. Yersin in 1904. In 1905 this institute received a Government grant of 75,000 francs and its maintenance was further facilitated by the sale of serums and vaccines. Since 1918 appropriations for this important laboratory form part of the budget of the colonial government of French Indo-China and Cochin China. The institute has been reorganized and functions as a laboratory of (1) human microbiology; (2) animal microbiology; (3) chemistry.

The Annals of the Faculty of Medicine of the University of Montevideo, a well-edited, well-printed, and illustrated magazine, contains (Vol. V, Nos. 9 and 10) a report of the Latin-American Congress of Odontology, which met in Montevideo, September 18 to 23, 1920. The inaugural session was held in the public hall of the university, Dr. R. Mezzera, minister of education, presiding, assisted by Dr. J. A. Buero, minister of foreign affairs, and by Don J. S. Burnett, the president of the congress. A feature of the meeting was an industrial and scientific exposition of odontology.

At the closing exercises the congress adopted resolutions regarding the following points: Need of instructing the public about the menace of pyorrhea; importance of special scientific study of this disease; insertion of a dental descriptive list in all Government documents requiring identification marks; the obligation of dentists to make records of their patients' dentition; the appointment of official dentists in territories having official physicians; recommendation to the Governments of Latin America relative to the teaching of dentistry. (This scheme provides that the studies required for admission to schools of dentistry shall be identical with the require-

ments of medical schools. A list of required studies for the dental course is given and the degree recommended is "Doctor in Dentistry.")

It is suggested that reciprocal facilities for study and reciprocal conferring of degrees be established only between countries having an equal standard of scholarship. Dental clinics are recommended in connection with all Army schools. The establishment of exchange professorships and exchange privileges for students is recommended to the Governments and universities of America. A congress is proposed for interchange of ideas between the dental schools of the American Continent. An increase of clinical dental work in the schools is urged on the Governments of Latin-America. The congress recommends as the method of choice in bridge work preparing abutments and points of fixation that shall not go below the gingival margin.

The fireproofing of fabrics as practiced in Germany is described in the translation by W. Hockey in *Scientific American Monthly* (February, 1921) of a German paper. It is not practicable to render articles whose fibers are of organic origin absolutely nonflammable, but a high degree of protection can be obtained. The principal chemicals employed are the borates, phosphates, stannates, tungstates, molybdates, with ammonium salts added. Specific directions are given for fireproofing jute, sail cloth, tentage, linen, fire hose, balloon and aeroplane cloth, and for the manufacture of waterproof clothing.

The medical officer and naturalist designated to accompany the expedition to explore and ascend Mount Everest under the joint auspices of the Royal Geographical Society and the Alpine Club, is Dr. A. F. R. Wollaston.

According to the Japan Advertiser of December 22, 1920, the Japanese Government is making strenuous efforts to improve the physical development of the rising generation. The daily physical exercises required of the children in the public schools are said to be far more exacting than anything of the kind in America. Measures are being considered for the correction of any weakness due to racial or other habits. Sanitary and health bulletins are being used for educational propaganda. Special funds to be expended on investigation of physical problems are being demanded by the Department of Education. There is apparently quite a ferment of activity along health lines.

Dr. William Boyd, professor of pathology in the University of Manitoba, from an observation of 75 cases of encephalitis lethargica and numerous cases of persistent hiccough developing in the locality at the same time, offers the suggestion that the poison in the two affections is the same, but differs in dosage. In mild infections the cervical origin of the phrenic nerve and not the brain is attacked.

Dr. E. Bellet, Médecin Principal, Marine Française, writing in *Arch. Med. et Phar. Nav.*, November, Vol. III, No. 1, urges on his countrymen a more extended use of fish as a food in view of the increased cost of domestic meat and the desirability of not depending on foreign imports. Fish is but infrequently used in France. In spite of 2,700 kilometers of coast line, exclusive of its near-by African colonial possessions, the annual per capita consumption of fish averages only 3 kilos, as compared with the corresponding figure 10 kilos for England (or Great Britain?). Prior to the war the annual consumption of fish in Paris was 13 kilos per capita, as compared with 123 kilos for London. For the year 1919 the value of fish imported into France from abroad amounted to 300,000,000 francs.

Dr. W. C. Braisted, formerly Surgeon General of the Navy, has been elected president of the Philadelphia College of Pharmacy.

Surgeon General E. R. Stitt, United States Navy, has been appointed a member of the executive committee of the Columbia Hospital for Women, Washington, D. C.

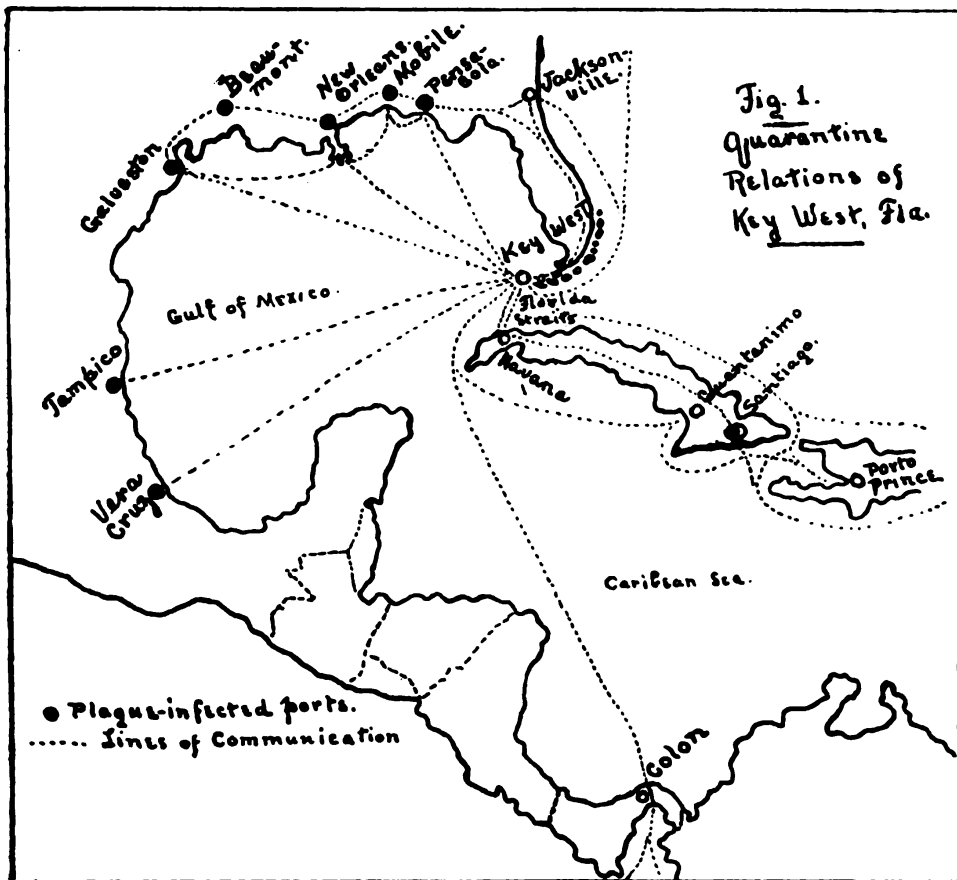
The United States Naval Hospital, Gulfport, Miss., was placed out of commission on May 13, 1921.

REPORTS.

PRACTICAL PROBLEMS IN RAT PROOFING AT THE KEY WEST NAVY YARD.

By P. E. GARRISON, Lieutenant Commander, Medical Corps, United States Navy.

When in June, 1920, bubonic plague had been reported both in rats and man in all the larger Gulf ports from Vera Cruz, Mexico, to Pensacola, Fla., and it became apparent that from the epidemiologi-



cal viewpoint practically the entire Gulf coast must be considered infected, the problem of protecting the port of Key West against the introduction of plague became a critical one calling for the exercise of every measure to insure its safety. The exposed position of Key West by reason of its geographical location and its lines of communication by both land and water is shown in the accompanying sketch (fig. 1).¹

¹ Error in map re Guantanamo.

The responsibility of the naval authorities was conceived to be a double one; to cooperate in every possible way with the city officials and officers of the United States Public Health Service in guarding against infection of the city, and, looking forward to a possible introduction of plague into the city, to make every preparation for the further protection of the naval personnel.

The measures taken for the protection of the naval station and the city of Key West consisted of the following: (a) A maritime quarantine; (b) an antirrat campaign; (c) rat proofing of the station. An outline of the quarantine established and of the rat-catching campaign is here summarized:

(1) The special quarantine, established by the commandant of the station, required all naval vessels from infected ports to lie off until visited by the medical officer. All vessels which had been alongside the dock of an infected port were required to be breasted off 15 feet from the local dock, with rat guards on hawsers and gangway. Any men who had been ashore in an infected port were required to remain under medical observation until the expiration of the incubation period. By special understanding with the quarantine officer of the United States Public Health Service, the quarantine service for naval vessels was left entirely in the hands of the medical officer of the station, who viséed their bills of health and forwarded them to him via the commandant. Provision was made for the fumigation of ships, but no occasion arose for its employment in the case of a naval vessel.

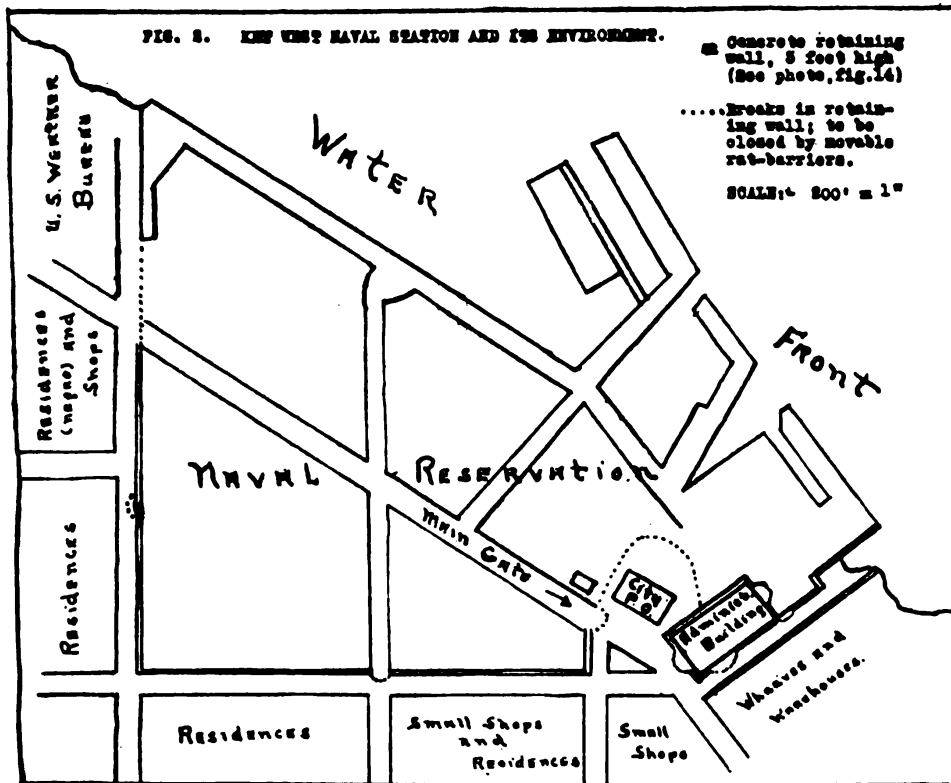
The antirrat campaign was started first at the naval station and the naval hospital and consisted of systematic trapping and examination of rats caught for evidence of plague infection. Rats caught at the hospital were brought to the station for examination.

Later, by cooperation between the commanding officer of the United States Marine Hospital (Dr. G. M. Guiteras), the city council of Key West, and the naval authorities, the rat campaign was extended to the entire city. The city council authorized a bonus of 10 cents per rat. The examination of rats was transferred from the naval station to the marine hospital, the medical officer of the station cooperating in the work. Later, the United States Public Health Service provided a medical officer to make these examinations and authorized the employment of a professional rat catcher and eight assistants. Guinea pigs were inoculated with material from all rats showing any signs which might be attributed to plague infection. Guinea pigs were also exposed in cages at points in the city where infection in rats might be expected to occur first, such as warehouses in the vicinity of wharves and of the freight depot. During the months of May, June, July, and August, about 2,000 rats (exclusive of about 3,000 mice) were caught and examined without finding plague infection and the work was discontinued.

The requirements of the general campaign present no unusual features. The practical problems encountered in rat proofing the station, however, called for very considerable study. While the general rules for rat proofing are well laid down, it is believed that any account of the practical application of these rules to the wide diversity of conditions found in the average navy yard, and with the necessary regard for the strict limitation of cost, may not be without value to those who find themselves with similar work.

THE OBJECT IN VIEW.

The accompanying plan (fig. 2) shows the situation of the Key West naval reservation in its topographical relations to the surrounding city. To the north are wharves and warehouses; to the north, east, and south are stores of various kinds and dwellings, many of the latter of a very inferior type. Trapping had demonstrated the environment of the station (as well as the station itself) to be rat infested. Under these conditions a question naturally arose with regard to the degree of benefit to be derived from rat proofing



the station so long as the adjacent city provided good rat harborage and breeding places only a street's width distant from the station's boundaries.

In a report to the commandant, under date of July 18, the following opinion was expressed on this point:

A word should be said with regard to the question naturally raised as to the actual results to be obtained by intensive rat extermination on the station so long as equally thorough measures are not carried out in adjacent parts of the city, from which a steady migration of rats may be expected. The answer lies in the established fact that rats migrate in search of food and of safe harborage for their runways and nests, and that they take up permanent residence only in localities where conditions are favorable in these two essential respects. We may expect the indigenous rat population of the station to be eliminated to the extent that the rat food supply and the rat harborage on the station

are abolished. An occasional migratory rat from the outside is of comparatively little practical importance so long as it does not find conditions favorable for obtaining food and for propagation. The question of placing a rat barrier around the station as a special protective measure in case of serious menace is considered in the last paragraph.

The following extracts from the same report set forth the general principles which were recognized and the practical aims adopted:

It must be recognized at the outset that the adoption and immediate application of the highest standard of rat-proof construction in an old navy yard is out of the question. This standard requires, briefly, an unbroken base wall of brick, stone, or concrete or other rat-proof material under the outside walls of buildings, extending not less than 18 inches into the ground and continuous with a layer of concrete covering the entire ground area under the building. It will be seen that not more than four or five buildings on the station even approach this standard and the prohibitive cost of remodeling the yard to this standard is obvious. A rough estimate shows that to provide such a base wall and concrete flooring only for the small group of frame buildings occupied by the submarine base at the southwest corner of the grounds would cost well over \$10,000. A second type of structure which by force of circumstances is accepted as satisfactorily rat proof where the cost of concreting is prohibitive is a building raised well off the ground (not less than 18 inches) on pillars (preferably of concrete) and with the ground area beneath the building kept clear and open. Many buildings on the station fall within this group, notably those transferred from the air station, though all are not a sufficient height from the ground or resting on satisfactory supports.

In addition to the structural character of the buildings, we have to consider the presence of culverts, conduits, scrap piles, lumber stacks, platforms, etc., which may offer good harborage for rats and provide favorable conditions for their runways and nests.

Most important, from every viewpoint, is the elimination of all food supply. It is scarcely too much to say that the station would become practically clear of rats if all sources of food could be absolutely cut off. We have tried to locate every possible source of food for rats on the station. To eliminate the source of supply or to make foodstuffs inaccessible has been the chief consideration in every situation studied.

THE PRELIMINARY SURVEY.

The preliminary survey, which was to serve as a basis for the public works officer in estimating costs, was made in minute detail. The necessity for thoroughness in this part of the proceeding can not be too strongly emphasized, for nothing is more futile, from a practical viewpoint, than observations and recommendations based upon casually strolling across the grounds or walking around and through a building. The general appearance of a building is no index to its rat-harboring capacity, as was well illustrated in the case of several structures on the Key West reservation, notably the new seaman's barracks.

To better systematize the work of inspection, the five fire districts into which the station is divided were adopted as sanitary districts, and each district was gone over systematically, and, in part, repeat-



Fig. 3.—Frame building resting on concrete floor with accessible wall spaces, showing excavation and openings made for a concrete base wall 18 inches deep and for filling wall space with concrete 18 inches above floor level. Base wall is continuous with cement floor and with cement filling in wall space.

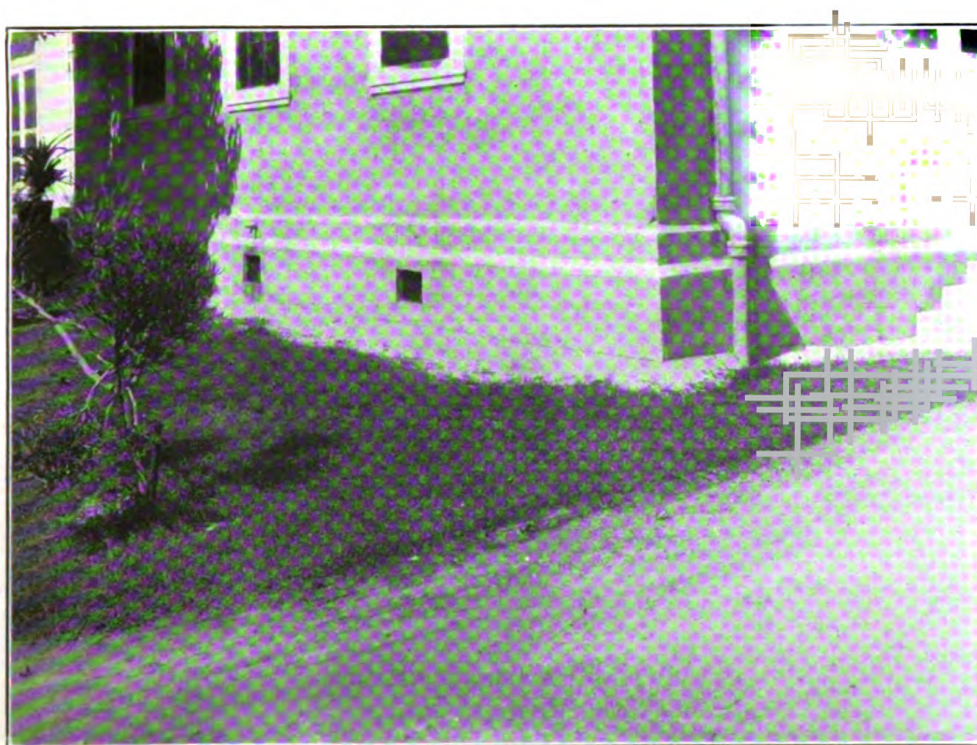


Fig. 4.—Seaman's barracks, a supposedly rat-proof structure built in 1918. Numerous rat burrows led under this building, which was heavily rat infested. Illustration shows top of concrete base wall sunk 18 inches into ground and made continuous with outer wall of building. Rats appear to have been completely eradicated.

676-1

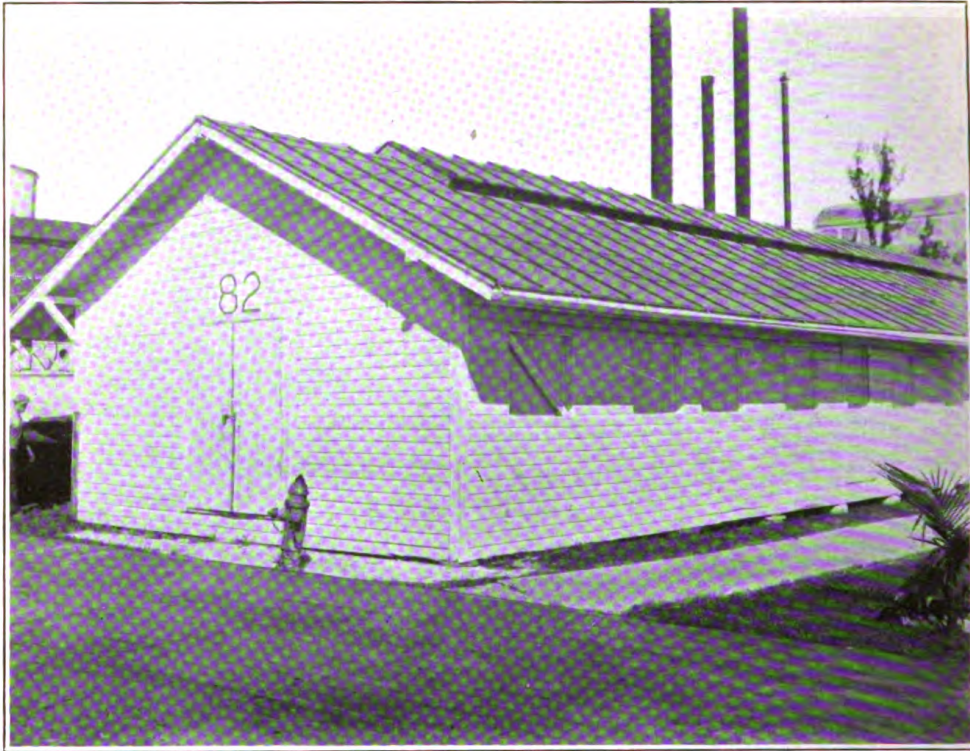


Fig. 5.—Frame building with board flooring, resting on wooden blocks within a few inches of ground. Buildings of this type were treated as shown in Fig. 6.

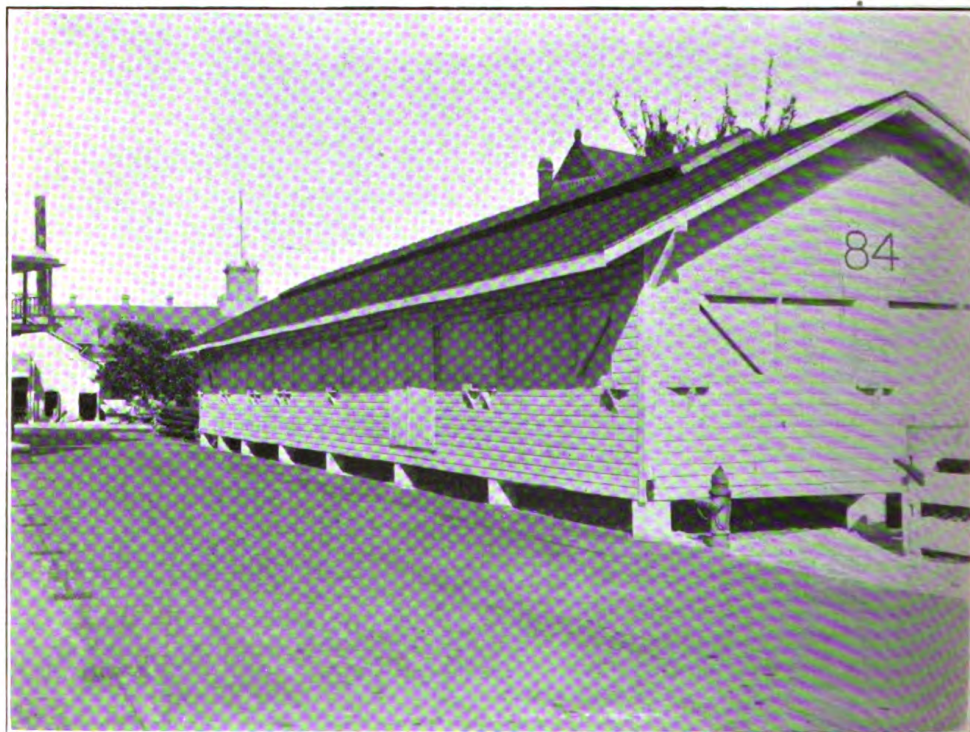


Fig. 6.—Building of type shown in Fig. 5, raised 18 inches off ground on concrete blocks.

676-2

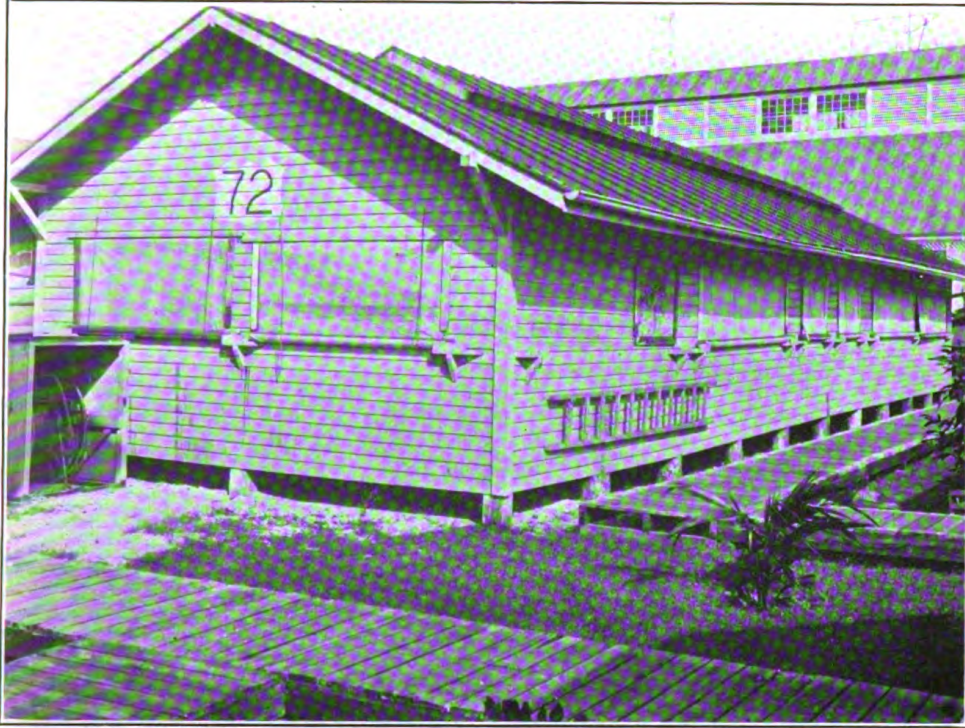


Fig. 7.—Frame barracks, with board flooring, 12 inches from ground, resting on wooden blocks; considered satisfactorily rat proof if containing no rat food supply. Board walks, which afforded favorite rat runways, were replaced with marl, as in Fig. 8. Board platforms for chemical fire extinguishers shown at left were replaced with concrete.

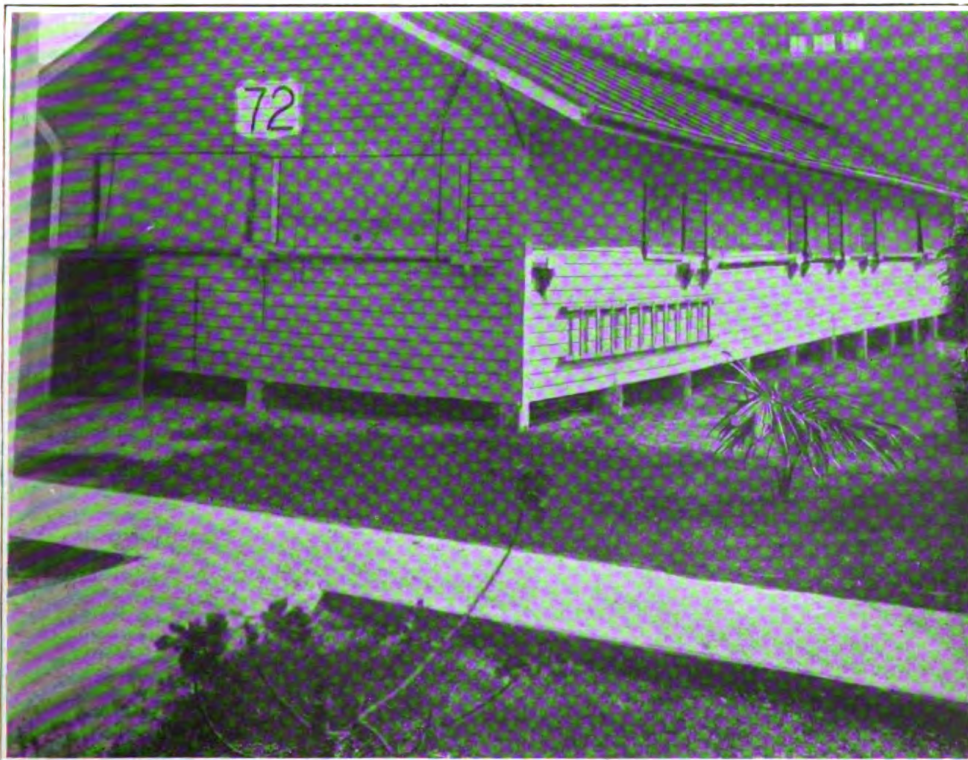


Fig. 8.—Board walks (Fig. 7) removed or replaced with marl. Concrete platform under fire-extinguisher shelter.

676-3



Fig. 9.—Foundry molds and iron scrap resting on ground; frame coke shed at the right. Excellent rat harbors. See Fig. 10.

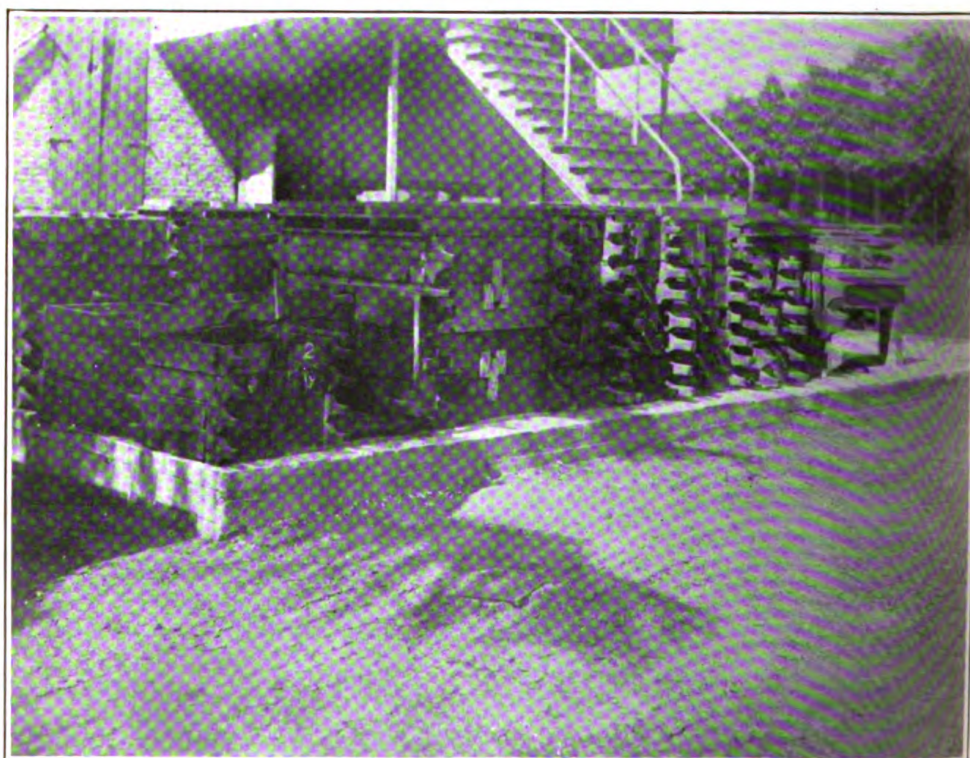


Fig. 10.—Foundry molds resting on concrete platform. Frame shed at right removed. All scrap metal provided with concrete scrap bins. See Fig. 11.

676-4

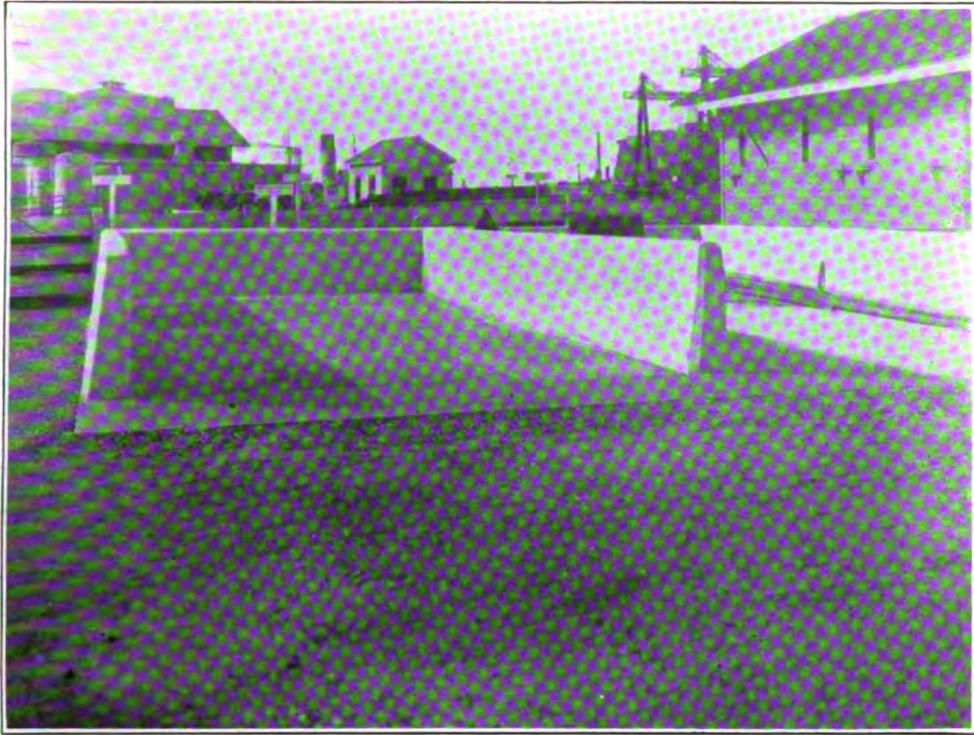


Fig. 11.—Type of concrete scrap bins provided for all scrap material, arranged in pairs and used alternately.



Fig. 12.—Wooden coal box, resting on ground; rat burrow visible at the rear. Replaced with concrete. (See Fig. 13.)

676-5

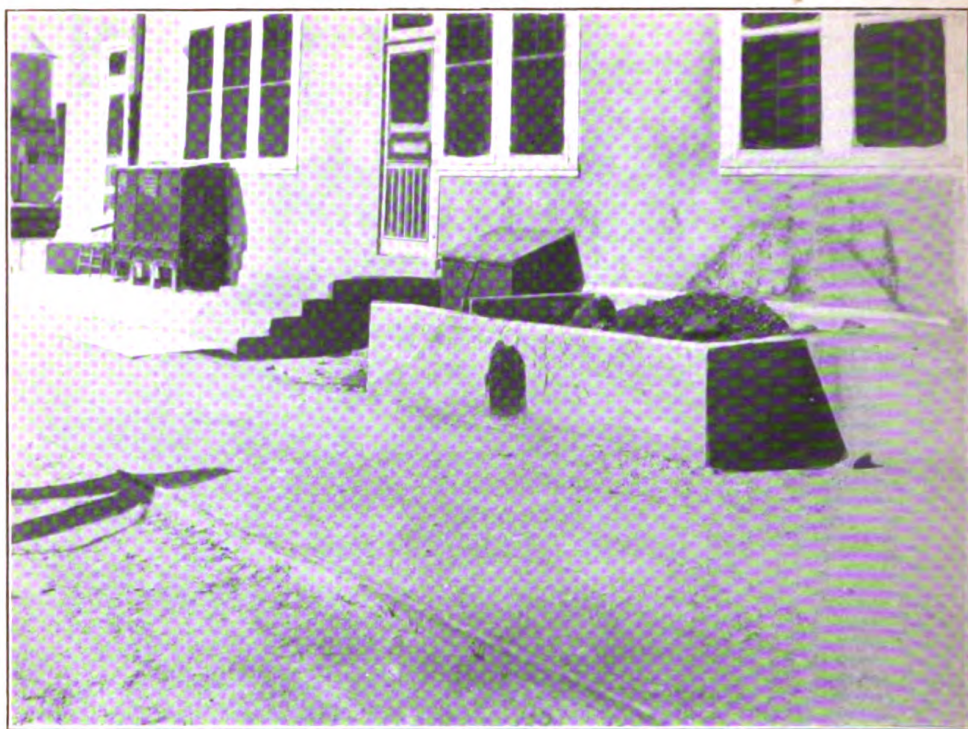


Fig. 13.—Concrete coal bin replacing wooden coal box. At the left, concrete platform provided for garbage cans and potato locker.

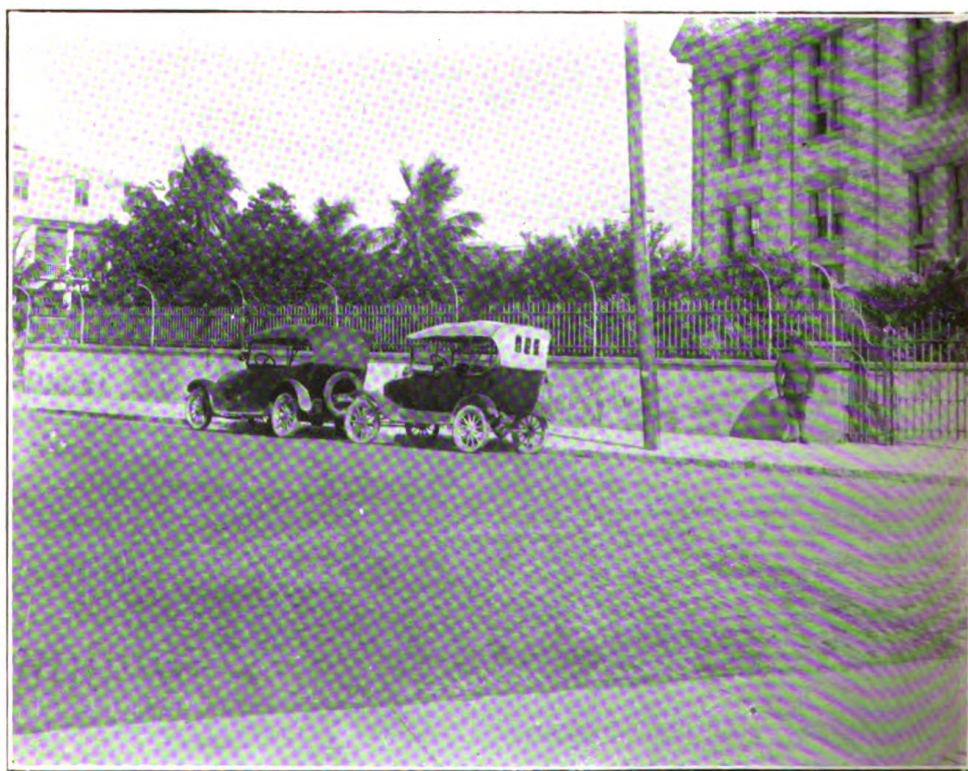


Fig. 14.—Concrete retaining wall, not less than 3 feet high at any point, and encircling the entire landward boundary of the station, excepting the breaks shown in Fig. 2.

edly, building by building. Groups of buildings and their environment made natural subdivisions within each sanitary district. It is necessary that the notes taken in the course of the inspections be sufficiently full and explicit to be intelligible when read over in the office perhaps several days later. Failure in this regard necessitated reinspection in a number of instances.

Throughout the preliminary survey four cardinal points were kept constantly in mind, namely, to locate all actual or potential rat runways, rat harbors, rat-nesting material, and possible rat food supplies.

Rat runways included all board walks, conduits, sewer mains, and wire cables between buildings and accessible inside floor and wall spaces.

Rat harbors consisted chiefly of accessible floor and wall spaces, scrap and lumber piles, unprotected ground areas beneath buildings, and lofts and storerooms containing improperly stowed material.

Rope, paper, and sail and other cloth afforded favorite nesting material.

Garbage carelessly spilled around garbage cans or made accessible by failure to keep cans tightly closed was one of the most important sources of food supply, as shown by the number of rats caught in traps placed around the cans. Inadequately protected commissary stores and food left by workmen from their lunches were other sources. The presence or absence of a possible food supply was given paramount consideration in deciding upon the standard of rat proofing required in a given locality.

FINDINGS AND RECOMMENDATIONS.

The various conditions encountered, together with the corrective measures proposed, may best be presented by extracts from the report made to the commandant at the close of the survey. In this report it was considered desirable to present the entire situation, including buildings and locations already in a satisfactorily rat-proof condition as well as those which were not so. The extracts are selected to illustrate as great a variety of conditions as possible:

RAT SURVEY.

SANITARY DISTRICT A.

(West of Front Street and south of Marine Railway.)

Food stores.—Building No. 64 (sub-base galley) :

(Not in commission.)

Building No. 8 (dispensary) :

Broken gratings in ventilator openings in base of wall to be replaced.

Openings around pipes entering building to be cemented.

NOTE.—The interior structure of the building, with spaces in walls and beneath board flooring, affords good rat harbors, but the solid base wall,

47720—21—12

well embedded in the ground, with openings above noted closed, makes access to the building impossible except through doorway. The building's exposed situation on the boundary line of the reservation, as well as its proximity to the sub-base galley, renders it a location to be carefully watched.

Buildings No. 7 (machine shop) and No. 11 (smithery) :

Both rat-proof structures. Lockers in smithery and coal bin and wood just outside smithery (west) should be on rat-proof platforms.

Building No. 33 (miscellaneous storage) :

Old frame structure with board floors near ground. A "rat trap." Should by all means be torn down. Cost of rat-proofing prohibitive.

Building No. 33A :

Small frame house at end of No. 33. Should be removed.

Buildings Nos. 61 to 65 and 70 to 73 (submarine base) :

No. 65.—Heads and bath with concrete floors; considered rat-proof.

Nos. 61 to 64 and 70 to 73.—Resting on wooden piles or stone blocks, with clear space underneath; accepted as satisfactorily rat-proof, if the following measures are taken to make food inaccessible and to abolish rat harbors and runways: Rat-proof metal containers provided for all food supplies. Garbage cans, trash box, wood and coal bins, and galley range provided with concrete platforms raised to level of galley floor.

All board walks (approximately 1,280 running feet) to be removed and replaced with marl walks.

Cement platforms laid under the two chemical fire extinguishers and under scuttle butt, the latter large enough to serve also for trash can (approximately 10 by 20 feet).

Building No. 59 (storage warehouse) :

Defective in that only half of the outer ground area has concrete flooring, the floor in rear being dirt, covered for the most part with planks, making excellent rat harbor. It is essential that the remaining ground area be covered with concrete (approximately 1,350 square feet).

Buildings Nos. 79 and 78 (boat, paint, and fitter's shop) :

These two buildings have frame walls and board floors. To make these in any way rat-proof requires filling in the space beneath floors and replacing board flooring with concrete. The concrete flooring should be made continuous with that along the marine railway. (Approximate area, 6,950 square feet.)

Building No. 21 (power plant, repair shop, and S. and A. stores), and No. 34 (boiler house) :

Buildings rat-proof.

Conduits are rat infested and openings into them should be closed with rat-proof material.

Building No. 10 (carpenter and electric shop) :

Board flooring (except small area of concrete at one end) is near ground; sills apparently rotten. Questionable if building could be raised. An excellent rat harbor, several having been caught. Building should be removed. If it remains, should be raised 18 inches or provided with concrete flooring throughout. (Approximate area, 1,125 square feet.)

Buildings No. 74 (tool shed), No. 75 (plumbing shop), and No. 76 (paint shop) :

These small buildings have cement bases and flooring. They may be considered satisfactorily rat-proof if kept free from lunch refuse or other rat food or nesting material.

Piling:

Just north of building No. 83 are about 25 creosoted pilings lying on the ground and making good rat harborage.

To be removed or racked 2 feet off the ground. Some 24 creosote piling just beyond are resting on a board platform with space underneath, which affords excellent rat harborage.

Lumber and scrap piles:

In this district of the station is the designated scrap yard and some other piles of lumber, piling, and metal scrap, lying directly on the ground and affording conditions favorable for rat hiding places and nests.

All of this material needs to be either stowed on racks well off the ground or on concrete platforms to prevent rats burrowing beneath it.

Scrap bins:

Concrete scrap bins to be constructed consisting of concrete flooring and concrete coping or wall around three sides of each bin. (Bins with plank flooring raised 2 feet on concrete pillars are satisfactorily rat-proof and a convenience in loading and unloading.)

Lumber racks:

Permanent lumber racks, built of steel ties, laid across concrete pillars, 2 feet from ground—or a lumber shed fitted with such racks.

It will always be difficult to keep lumber piled promiscuously in vacant ground spaces about the yard free from rats and mice. The establishment of a lumber yard, with rat-proof sheds and racks, is strongly recommended.

Building No. 4 (sentry box):

To be raised 1 foot.

Pier A:

Rat-proof.

Building No. 39 (oil storehouse):

Building structurally rat-proof. Gratings in ventilator openings through north wall are broken; also one open drain pipe.

Building No. 45 (communication office):

Heavy brick construction; board flooring and inside wall sealing. Satisfactorily rat-proof in view of purpose for which used.

Buildings E, D, C, and G, in district E, and Building F in district D (officers' quarters):

These buildings are not rat proof, the chief objection being the sealed-in wall spaces and wooden flooring. But they are not likely to become heavily rat infested on account of their good elevation (2 to 3 feet) from the ground on rat-proof pillars, and their isolation from each other and other buildings. The ground space beneath is open and clear, excepting C and D, which have wooden latticework inclosing them.

The latticework inclosing the ground space of buildings C and D should be removed.

The lumber piles in close proximity to quarters are objectionable (see above).

Gymnasium and theater:

Frame buildings, with board flooring; sills 3 to 10 inches off ground. Satisfactorily rat proof in view of unsealed walls and absence of food stores.

Building No. 66 (seaman barracks) :

Apparently of rat-proof construction except for defective ground area wall, which rests on piles and does not extend a sufficient depth below the ground level. At places there are clear spaces leading under the wall into the ground space under the floor. This space has been found heavily infested with rats.

To make the ground area of this building rat-proof requires either raising the ground level by filling around the base to a height of from 12 to 18 inches, which appears scarcely practicable and would be of questionable efficacy, or to sink a concrete wall to a depth of 18 inches, close against and continuous with the present base wall.

Either a new concrete coal bin should be constructed or a cement platform built under the present coal bin, where rats now have their burrows.

Rat barrier about station :

This measure which has been very effectively used around particular premises in the midst of a plague-infested community, is particularly easy and practicable of application at the Key West Navy Yard by reason of the yard wall inclosing almost the entire station, which affords a very good rat protection. Breaks occur in this wall only at the five gates and the two ends. At the south end of the grounds there is no wall from the west gate on Eaton Street to the sea wall, a distance of about 150 feet. At the north end the wall stops at the main gate, and just beyond the gate the post-office building and grounds project into the station area. Naturally the post office would be kept outside the barrier.

Buildings Nos. 1 and 39 effectively barricade the north line to the water front, excepting the open gateway between them.

To complete the rat barrier around the entire yard boundary, from water front to water front—total distance 3,000 feet—would require only the following construction :

- (a) 150 feet at the end of Eaton Street.
- (b) 300 feet from main gate to Building No. 1, around rear of post office.
- (c) All gateways bricked in except the main gate.

PLANS AND ESTIMATES.

The report made by the medical department was forwarded to Lieut. Commander Samuel Gordon (C. E.), United States Navy, public works officer of the station, for technical consideration of the best methods for carrying out the recommendations made and for an estimate of costs. A first preliminary rough estimate was made of about \$23,000. This estimate was then gone over in detail, each situation being studied by the public works and medical officers in consultation. This further study resulted in a reduction in the estimate of costs to a total of \$15,275. This sum was allowed by the Bureau of Yards and Docks, upon approval of the Bureau of Medicine and Surgery, and the work was begun.

The personal interest taken in the work by the public works officer contributed an essential factor to its success and his resourcefulness

in devising methods and utilizing labor and materials to the best advantage kept the cost within modest limits.

RESULTS.

The work of rat-proofing the station was begun late in September and completed about March 1. It was decided to put the results accomplished to a practical test by repeating the rat-catching campaign of last June. The following extract is quoted from the Monthly Sanitary Report for March, 1921. One rat was caught the day after this report was written.

The rat-proofing of the station, mentioned in previous reports, having been completed, a practical test was made during the past month to ascertain the prevalence of rats on the station, in comparison with that of last summer, as indicated by systematic trapping. Fifty traps were set about the buildings and grounds, in the same locations as in June, 1920, when systematic trapping was begun as a part of the plague-prevention campaign. Care was taken to use the same bait, to exercise the same precautions in the handling and placing of traps, and in all other respects to reproduce the conditions of last June.

Fifty traps were set on March 21 and have been inspected and rebaited every day, five days in the week. Up to the present writing (April 8) no rats have been caught, and only one mouse.

In June of last year, with 37 traps, 8 rats and 2 mice were caught the first night, and 20 rats and 3 mice the first week. The second week of trapping, with about 60 traps, yielded 14 rats and 1 mouse; the third week, with from 80 to 90 traps, 13 rats and 6 mice. While the first three weeks in June resulted in a total of 47 rats and 10 mice, the same effort during the three weeks just passed has failed to catch any rats and only one mouse.

Inquiry among the watchmen, laborers, and enlisted men appears to bear out the negative evidence of trapping in as much as it is difficult to secure any report of a rat having been seen, a condition very much in contrast to that of nine months ago when rats were in evidence constantly about the buildings and grounds.

Systematic rat-trapping was discontinued September 1. The interval of six months before trapping was resumed undoubtedly would be ample for the renewal of the rat population by immigration and breeding. The marked reduction in the number of rats can not be attributed to trapping, but appears to indicate the very satisfactory result of the measures taken to render the station rat-proof.

FIFTH CONGRESS OF THE INTERNATIONAL SOCIETY OF SURGERY, PARIS, JULY 19 TO 23, 1920.

Reported by S. B. BURK, Lieutenant, Medical Corps, United States Naval Reserve Force
(inactive).¹

The congress was formally opened by the president of the society, Prof. W. W. Keen, of Philadelphia, who delivered an address in French on new ideals for surgeons. After a glowing tribute to vic-

¹ Dr. S. B. Burk, F. A. C. S., instructor in surgery, New York University and Bellevue Hospital Medical School, New York, was present at the meetings.

torious France and her surgeons' contributions to science as well as to humanity, the venerated president eloquently exhorted the society to hold fast to its records of broad culture, patient research, and high professional honor, while redoubling its energies in the battle against disease and vice. Prof. Keen spoke of the extermination of yellow fever by Maj. Gen. Gorgas, Carlos Finlay, and Walter Reed, and gave a number of statistics of the decrease of crime, disease, and accident in the great American cities since the enforcement of prohibition.

ANALYSIS OF THE BLOOD AND BIOLOGICAL REACTIONS IN SURGERY.

The first subject for discussion was the analysis of the blood and biological reactions in surgical cases. Prof. Depage and Dr. Govaerts, of Brussels, stated that if the red blood corpuscle count falls below 4,000,000, or a relative loss of 1,000,000 cells, in the first few hours after the initial wound the prognosis is fatal. Immediate blood transfusion is indicated if the red blood corpuscle count falls below 4,500,000, a loss of 500,000 cells, in the first 3 hours, or 4,000,000, a loss of a 1,000,000 in the first 6 to 8 hours, or below 3,500,000 a loss of 1,500,000 in the first 12 hours. They found also that the greater the loss of blood the less efficacious were the injections of physiological salt solution. The transfusion of human blood was widely adopted and the authors found that if the blood injected was carefully selected so as to avoid agglutination, it persists in the circulation during, at least, 10 days.

SOME SURGICAL ASPECTS OF ASPHYXIA.

Prof. Evarts A. Graham, of St. Louis, selected for his address the question of asphyxia in surgery. Asphyxia from an interference with the intake of air was investigated in a series of experiments from which the speaker concluded that the maximum opening into a pleural cavity that is compatible with life for an average normal man for a short time is about 64.8 square centimeters. The effects of disturbances of tissue respiration are both anatomical and physiological.

The former disturbances, in general, consist of the syndrome of edema, fat filtration, hemorrhages and necrosis. The physiological disturbances comprise the phenomena of the so-called "acidosis" changes in the respiration, glycosuria, etc. Prof. Graham warned his colleagues against the use of chloroform as an anesthetic in nephritic conditions, emphasizing the importance of an impaired kidney function as a factor in the production of an acidosis, and against the practice of starving the patient for several hours before operation and of withholding all food after the operation for two

or three days. Glucose should be given by the rectum or in 2 or 3 per cent solutions subcutaneously to practically all patients. Dr. Graham further summarizes his observations as follows:

Asphyxial conditions may be produced in any of the following ways: First, an interference with the intake of air; second, an interference with the power of the blood to carry oxygen or to remove carbon dioxide; third, an interference with the circulation of the blood; fourth, a disturbance of the power of the tissues to utilize oxygen. An interference with the intake of air is frequently brought about by changes within the lungs, such as inflammatory exudates, and by abnormal pressures outside the lungs which limit their normal expansion. The principal agents which restrict the expansion of the lungs by pressure, are air and fluid. New experimental work on pneumothorax is discussed which indicates that in the normal thorax when a change of pressure occurs in one pleural cavity practically the same change occurs in the other pleural cavity. Both lungs are therefore nearly equally compressed, and the commonly accepted condition of collapse of one lung with maintenance of respiration by the other does not occur. The presence of adhesions, however, may permit a marked difference of pressure in the two pleural cavities. A mathematical expression is given by which it is possible to calculate approximately the maximum nonfatal opening of the chest wall. In conditions of low vital capacity this maximum opening becomes smaller, and if the vital capacity is so low as to equal the tidal air it will be impossible to withstand any opening. The importance of this fact in connection with the treatment of acute empyema, especially of the streptococcus type, is emphasized.

SURGERY OF THE HEART AND BLOOD VESSELS.

Prof. Tuffier, of Paris, opened the discussion by a paper on cardiac operations for recent wounds and the removal of foreign bodies.

Heart wounds show a higher rate of mortality without surgical intervention than with it. For diagnosis, the immobility of the pericardial shadow in the fluoroscope is an important positive sign. Foreign bodies are cut out during the primary operation if they are easy to reach and later on according to the accidents they provoke. They may be left if they cause no accidents or if they are lodged in the walls of the heart.

In operations on the heart there are three ways of approach. *First*: The thoracic flap with the base externally. This goes across the middle of the sternum and opens up the fourth, fifth, and sixth costal cartilages and exposes the pericardium. This approach has the disadvantage of opening the pleural cavity. *Second*: A simple intercostal incision at the level of the fourth space opens the thorax

and the pleura, without resection of a costal cartilage and gives a large field for access to the heart. This is the preferred method when there is a pneumothorax or a hemothorax. *Third:* The thoracolaparotomy method. A vertical median-line incision is made over the sternum and extended downward to the abdomen. The lower end is continued transversely and opens the abdominal cavity. The sternum is also split transversely at the level of the third interspace. The purpose of this technique is to avoid the pleura. The pericardium is severed with careful attention to avoid the phrenic nerves, and in recent wounds, clots can be readily removed. If the wound is recent and dry, suture with linen or silk thread and a round curved needle is indicated. If there is a loss of substance, a muscular or fibrous autoplasmic operation is required. If the wound is bleeding the hemorrhage is stopped by digital compression.

All incisions of the heart for the removal of a foreign body or to repair an endocarditic lesion must avoid the dangerous zones of His's bundle, the interauricular fibers, the great coronary vessels, and the aorta from its base to its bifurcation.

For the extraction of foreign bodies, the heart is grasped in the hand and the region to be incised is limited and isolated between two fingers. Operative complications are cardiac syncope and hemorrhages, which may be remedied sometimes by massage and saline and adrenalin injections. In the first 10 minutes the patient has the greatest chance of resuscitation. Direct injections of adrenalin solution 1/1000 in a dose of 1 c. c. into the cardiac parenchyma or the ventricular cavity has given Tuffier encouraging results.

Prof. Sencert, of Strasbourg, then read a paper on the surgery of the great arteries, in which he declares that although suture of the vessels is the ideal procedure, ligature is to be preferred for the medium sized and small arteries such as the radial, cubital, and tibial. For the aorta, the vena cava, the carotid, and the iliac suture alone is admissible and always to be preferred. The subclavian, axillary, femoral, and popliteal vessels are to be sutured unless there are clear evidences of a sufficient collateral circulation. In peri-arterial contusions, if the segment to be resected does not exceed four or five centimeters, end-to-end suture may be practiced. In arterial aneurisms Sencert concludes that lateral suture, and especially circular suture, give the best results, and in rare cases vascular grafts may be used.

In arteriovenous aneurisms, extirpation, quadruple ligature, vascular suture, and graft are the therapeutic methods at our disposal, of which suture seems the best.

Sencert in conclusion stated: "The countless cases of wounds of the big blood vessels brought to our notice by the war of 1914-18 have greatly increased our knowledge of vascular surgery, perfected

our technical skill, and improved the results obtained. This immense experience has shown that any recent vascular wound should be at once operated on, whether it bleeds inwardly or outwardly, or whether it is of 'diffuse hematoma' origin, or even if it does not bleed at all. The aim of the first operation should be to bring about an anatomical and functional restoration of the wounded artery. Ligation, the detrimental consequences, both direct and indirect, of which have been proved in a great number of cases, is only to be resorted to should it be absolutely impossible to make a lateral or circular suture. The surgical treatment of the remote consequences of arterial wounds is reparative. Should it be even a question of accidents due to the obliteration of aneurism, either arterial or arteriovenous, reparative surgery should be the aim of any treatment. We have often seen since 1914 the disappointment expressed by very competent surgeons who, after having been attracted by the theory of vascular reparative surgery, have nevertheless thought fit to give the preference to methods that Forgue calls at once more radical and safer. This disappointment is not justified; the necessary efforts to obtain successful results have not always been made. I am sure that those who are thoroughly convinced of the potentialities of the reparative system of treatment of the big blood vessels will remain faithful to it and will even follow it up more closely. Their labour will have its reward."

Dr. Charles Goodman, of New York, read his paper on blood-vessel surgery. He quoted the statistics of Solomon, which cover 460 cases, and record 31 per cent of gangrene after ligation of the blood vessel and 21 per cent after suture. The mortality is the same in both methods, namely, 0.9 per cent. The Allied surgeons generally preferred ligation to suture in the field as being more expeditious, while the German surgeons used the perfected technique of the Franco-American surgeon, Carrel, with brilliant success. Dr. Goodman reported five cases of wounds of the popliteal vessel which he sutured and which were cures, although operated upon under all the disadvantages incident to hospitals at the front. The technique used was substantially the same as that of Carrel (end-to-end suture in a triangle with 3 guide stitches). The dangers of secondary hemorrhage after suture have been exaggerated. Slight infection may be successfully combated by the Carrel-Dakin solution, which has no injurious effect on the line of suture. Various grafts, though excellent in results, constitute a complicated procedure which should be reserved for the base hospitals and civil practice.

Dr. Goodman gave an exhaustive history of blood transfusion from its inception in France in 1667 with Jean Baptiste Denys, the court

physician of Louis XIV, to its revival in America by Carrel, Buerger, Elsberg, Levin, Soresi, Lewisohn, Lespinasse, and Lindemann. The sodium-citrate method, first employed by the Argentine, Agote, and perfected by Weil and Lewisohn, of New York, was adopted by the American Army, since it had been proved that sodium citrate as an anticoagulant does not injure the blood corpuscles and is nontoxic. The Moss classification of donors into four groups according to the hemolytic and agglutinative properties of their blood is further simplified in practice by selecting as frequently as possible donors of the fourth group, which comprises 43 per cent of all donors and whose blood is not agglutinated by any other group. The patient's blood does not then need to be tested. During the war donors were chosen from patients either convalescent or with slight wounds and who had no history of either syphilis, malaria, or trench fever. Hemorrhage is the chief indication for transfusion, and the latter is imperative when the blood count falls 1,000,000 red blood cells and the hemoglobin 20 per cent. Dr. Goodman mentioned Ashby's series of agglutination tests undertaken to discover the reason for the benefits following citrate transfusion, which proved that transfused red blood cells remain alive for about 30 days in the recipient's blood.

In the heart surgery division of his address Dr. Goodman comments on the extraordinary tolerance of the heart for foreign bodies.

An original method of exposure of the heart is described by Dr. Goodman, which would give ready access to all parts of the heart without incurring the dangers of a pneumothorax or pleuritis. An intercostal incision is made in the third, fourth, or fifth interspaces down to the pleura. The latter can usually be separated bluntly from the anterior chest wall with the fingers. McBurney's division of one, two, or three cartilages close to the sternal margin after ligation of the internal mammary artery exposes the pericardium. The pericardial sac is then lifted and incised between mouse-tooth forceps for any desired extent without encroaching upon the pleural cavity. Carrel's tube-covered clamps, which may be applied to the vessels at the base of the heart for 45 seconds, enable the operator to place the one or two sutures which suffice for a stab wound.

In the résumé of the principal scientific theories on thrombosis, Dr. Goodman said he believed that the secondary hemorrhages of war wounds are often due to the invasion of a thrombus by the hemolytic streptococcus. The contact of the infected thrombus with the wall of the vessel causes the necrosis of its wall and consequent hemorrhage. The report was concluded with the exhibition of lantern slides of the heart operation mentioned above, and tables of

statistics compiled from the reports of war surgeons, which may be summarized as follows:

1. Sutures of arterial wounds, 22; gangrenes, 0; deaths, 1; cures, 21.
2. Ligatures for arterial wounds, 44; gangrenes, 2; deaths, 9; cures, 33.
3. Sutures for aneurisms, 236; gangrenes, 7; deaths, 3; cures, 226.
4. Ligatures for aneurisms, 337; gangrenes, 30; deaths, 11; cures, 296.
5. Vascular grafts, 12 (11 cures, 1 improvement). Total, 268 sutures resulted in 256 cures, 7 gangrenes, and 4 deaths, while 381 ligatures gave 329 cures, 32 gangrenes, and 20 deaths.

Prof. Alessandri, of Rome, in his address agreed with Profs. Tuffier and Goodman as to the future triumph of suture in blood-vessel surgery. He gave a detailed history of 93 heart wounds operated upon in Italy since Farina's first case in 1895. The mortality was 32.25 per cent, which may be considered favorable. The Italian vascular surgery cases reported by Alessandri are for the most part included in Dr. Goodman's statistics. Alessandri himself performed suture in 75 per cent of the vascular wound cases which came to his hospital. He claims precedence for the Italian surgeon, Anel, of Spezzani, in the ligature of aneurysms, as antedating the operations of Desault and of Hunter.

Prof. Jeanbrau, of Montpellier, claimed that he was the first to use the sodium citrate transfusion method in France and reported a simple method of testing the blood of donor and recipient. First, 2 to 3 c. c. of blood are taken from the recipient and left to coagulate for half an hour. A drop of blood from the donor is then mixed with it. If the mixture turns a pale homogenous pink there is no agglutination, and the transfusion can be carried out. If the opposite is true, a series of reddish-brown specks are formed very rapidly in the donor's drop of blood, which is a sign of agglutination. Transfusion is then, of course, contradicted.

In the discussion, Dr. Delagenière, of Le Mans, was an advocate of double ligature in vascular surgery, and Dr. Proust, of Paris, called attention to the intracardiac nervous-conductibility disorders secondary to operations on the heart. Dr. Soubotitsch, of Belgrade; Hallopeau, of Paris; and Van Tienhoven, of Rotterdam, were advocates of suture, while Lenormant and Auvray, of Paris, favored ligature.

FRACTURES OF THE FEMUR.

Prof. Kellogg Speed, of Chicago, regretted that there is no national American standard of treatment and emphasized the necessity of X-ray examination of all fractures of the femur and of keeping fracture record sheets in all hospitals after the form which has been compiled by the American Surgical Association, so that an ideal treatment may be worked out from combined experience with the accepted methods.

General Results:

Good

Moderate

Bad

Anatomical

8

11

5

Functional

1. Bone-----.
2. Site—Neck: Upper. Middle. Lower 3rd. Condyle. Involving joint: Yes. No.
3. Name-----.
4. Sex: M. F.
5. A-----.
6. Occupation-----.
7. Time fracture occurred: Date----- Hour-----.
8. Hospital entered----- Date----- Hour-----.
9. First treatment: Date----- Hour-----.
10. Cause of fracture-----.
11. Kind of fracture: Oblique. Transverse. Spiral. Impacted. Comminuted. Simple. Compound.
12. Was there serious injury to soft parts—Skin: Yes. No. Muscles: Yes. No. Vessels: Yes. No. Nerves: Yes. No.
13. Reduction: How many hours elapsed after accident before reduction?-----
14. Was anatomical reposition of fragments obtained? Yes. No.
15. Anesthetics used: Yes. No. Ether. Gas.
16. Fixation—*Closed method*:
Position: Hyperflexion. Full supination. Abduction.
Splints. Plaster of Paris.
Traction: Buck's. Jones's. Hodgen. Bardenheuer. Steinman. Amount of weight used-----.
17. *Open method*:
Was nonoperative treatment tried first? -----.
How long after injury was operation performed? -----.
Was open reduction alone performed? -----.
What form of internal fixation used? Steel plates. Wire. Nails. Screws. Bone transplants.
What is later necessary to remove fixation materials? -----.
18. Shortening at first examination ----- cm. When all apparatus removed ----- cm. Date -----.
19. X-ray: Yes. No. First finding on the ----- day before: ----- on the ----- day after reduction. Fragments displaced: Slightly. Markedly. Fair apposition: Yes. No. Anatomical: Yes. No. Overriding ----- cm. Rotation: Yes. No. At last finding on the ----- day: Overriding ----- cm. Apposition fair: Yes. No. Anatomical: Yes. No.
20. How long confined in bed? ----- How long in hospital? -----.
21. How long did patient use crutches? ----- Cane? -----.
22. Results: Final examinations made ----- weeks ----- months after injury. Union: Bony. Fibrous. Nonunion.
23. Disability: Partial. Complete. Estimated by deformity: Shortening. Angulation. Swelling of soft parts. Pain. Nerve involvement. Interference with joint function. Endurance.

24. Mortality: Age of patient ----- Main cause of death -----
 25. Duration of absence from work ----- weeks ----- months.
 26. Is patient fully able to take his former job? -----
 27. Present wage-earning capacity compared with former -----
 28. Compensation under insurance, legislative act, or legal process obtained: Yes. No. Expected: Yes. No.

Speed laid particular emphasis on the main objects of a proper system to handle fractures of the femur. These are: Firstly, to apply the principles of Hilton as described in his work on "Rest and Pain"; secondly, to simplify the apparatus and its use, as much as possible; and thirdly, to apply the same broad mechanical principles to the cure of fractures of all long bones with such modifications and minor details as are necessary to conform to the anatomical differences of the various structures involved.

Maj. Sinclair, of Netley, England, had an experience of four months in 1918 with 1,260 cases of fractured femurs. Sinclair's net frame and a Thomas's splint were used with success, and extension was secured by means of a temporary skewer, glue, or screw into the tibia with the pull below the knee.

Sinclair summarizes his paper as follows:

1. Compound septic fractures must be extended, immobilized, and efficiently drained.
2. In the case of wounds, the best results are achieved when treated by aseptic methods, immobilization, drained by gravity and dry dressings.
3. Only totally detached and loose bone should be removed.
4. All fractures of the lower limb can be effectually treated in two splints:
 - (a) Sinclair's net frame.
 - (b) A Thomas's splint.
5. About 10 per cent of all fractures are not completely reduced mechanically. These are reduced by open operation, wired and splinted.
6. The splint must be suspended for nursing, facilitating dressing and comfort; the greater the comfort, the better the immobilization.
7. The most satisfactory means of exerting extension is by means of a skewer (temporary), glue, or screws into the tibia with the pull below the knee.
8. Joint movements should be started early, after sepsis is under control and feeble union of the fractured ends have taken place.
9. The X-ray is the "ophthalmoscope" of the fracture surgeon.

Prof. Patel, of Lyon, France, in his paper stated that he preferred open operation in younger patients or Delbet's apparatus for continuous extension.

RADIOTHERAPY IN SURGERY.

Prof. G. Mioni, of Rome, Italy, found that on account of the exclusively local action of radiotherapy the surgeon is not yet justified in abandoning the radical operation for cancer. Mioni's views may be stated as follows:

Improvements in appliances allow of more complete irradiations to-day than formerly. However, certain zones may always remain, which by reason of their situation or their depth are in no way affected by the rays or are only affected in an absolutely insufficient manner.

Surgical methods are also strictly local in these cases. Irradiation therapeutics would at least have the advantage of giving a lower immediate mortality.

Cases which lend themselves to operation belong to the surgeon; nothing yet authorizes us to abandon surgical methods, which can give us a determined percentage of probable cures, in order to choose a bloodless but less sure method of treatment. In these cases, however, we shall obtain excellent results by prophylactic irradiation after the operation, in order to destroy the neoplastic elements which may have remained.

Irradiation therapeutics should be reserved for these cases where an operation is possible, but only when general indications exist, for cases of relapse which are no longer susceptible of surgical treatment and for cases which from their very origin show that they cannot be operated upon. Under the action of irradiation these cases may regress to a condition susceptible of operation. This constitutes a further argument in favor of the treatment. In any case, the treatment often results in an amelioration. It is useful to have the treatment by rays preceded by the most thorough cutting away possible of the tumorous masses and to render them accessible to direct irradiation. In very advanced cases where any operation is not possible the methods will be employed with prudence, for they may provoke serious complications and consequences which are not without importance.

Dr. Greenough, of Boston, agrees with him and furthermore states:

1. As the result of exposure of living tissues to radiation four types of "reaction" may be observed:

- (a) Massive destruction;
- (b) Inhibition of growth;
- (c) Stimulation of growth;
- (d) Modification of growth.

2. A specific sensitiveness to radiation appears to exist by reason of which certain cells are more susceptible to damage by radiation than others.

3. There is reason to believe that cells in the process of mitotic cell division are especially sensitive to damage by radiation.

4. There is reason to believe that in certain tissues the sensitiveness to radiation diminishes with repeated exposures.

5. While massive destruction of tissue demands a maximum dose of radiation sufficient to destroy the cells of all of the different kinds in the tissue area involved, the other effects, inhibition, stimulation, or modification of growth, may be exhibited by cells of a single type and with smaller doses of radiation.

6. Massive destruction is produced only within a relatively short distance of the source of radiation, while inhibition, stimulation, or modification of growth may be obtained at a greater distance by deep radiation without destruction of the overlying tissues.

7. In the treatment of nonmalignant diseases, and for the palliative (non-curative) treatment of malignant tumors, the inhibiting, stimulating, or modifying effects of radiation are of value, but for the cure of cancer the massive destructive effects must be obtained.

8. In judging the results of treatment of cancer by radiation a three or five-year period of freedom from recurrence should be demanded, as in the case of treatment by operation.

Prof. N. S. Finzi, of London, classifies the radiation treatment according to the following table:

Category I. Growths to be treated by radiations in preference to surgery:

Lympho-sarcoma.

Rodent ulcer.

Category II. Growths in which surgery or radiation treatment is optional (prophylactic radiation used in either case):

Endothelioma which has assumed malignant characteristics.

Epithelioma of the lip.

Epithelioma of the skin (early stages).

The cauliflower noninfiltrating type of epithelioma of the tongue or palate.

Epithelioma of the penis (ordinary type).

Carcinoma of the body of the uterus.

Category III. Growths for which surgery is preferred to radiations, but for which prophylactic radiation is used:

Carcinoma of the breast.

Carcinoma of the rectum.

Carcinoma of the ovary.

Epithelioma of the tonsil, floor of the mouth, larynx, pharynx, skin (later stages), anus.

Spindle celled sarcoma.

Alveolar sarcoma.

Melanotic sarcoma.

Hyper-nephroma.

Glioma.

Category IV. Growths for which radiation should not be used:

Epithelioma of tongue (infiltrating type).

Epithelioma of vulva.

Inoperable growths in categories II and III or cases in these categories in which, for some reason, operation is contraindicated will of course be treated by radiation, and in these will be included carcinoma of the esophagus.

In the discussion Dr. Frazer, of Philadelphia, reported 24 cases of cerebral tumors treated by radium, with 33 per cent mortality, 55 per cent improvements, 9 per cent cures, and 9 per cent indefinite results.

TETANUS.

Prof. Cummins, of London, summarizes his review of the statistics of the British Expeditionary Forces as follows:

1. Statistics as to the incidence of tetanus amongst the wounded in the late war show that the proportion of wounded men developing tetanus was much

greater during the first four months, when supplies of antitetanic serum were inadequate, than at any subsequent period.

2. The universal use of prophylactic inoculations of antitoxin for all wounded, dating from 1915, was followed by a reduction in tetanus case-incidence, a reduction in case mortality, a marked prolongation of the incubation period, and an amelioration of the severity of the disease.

3. Tetanus, in those cases to which a prophylactic injection had been given, tended to take on a "modified" form. "Local tetanus," a condition unknown in previous wars, became common in the past war, and showed a marked tendency to recovery.

4. There can be no doubt that the above results have been attained, in the first place, by the almost universal employment of prophylactic injections of antitetanic serum.

5. While the prophylactic injection must be given the first place as the agent for amelioration of tetanus in war, improvement in surgical technique, more especially the early excision of wounds, was also the means of still further diminishing the danger of tetanus infection.

6. Although animal experiment has clearly demonstrated that intrathecal injections of antitoxin have a curative effect on animals inoculated with lethal doses of tetanus toxin, and although many individual surgeons have believed that recovery has been brought about in their cases by serum therapy, the statistical records of the late war do not give any clear indication that antitetanus serum has been of value in treatment. In view, however, of the numerous favorable reports by individual surgeons, it is advisable to give every patient the chance afforded by specific serum therapy. When antitetanic serum is used for treatment, it is advisable to give it early and in large doses.

7. The intrathecal route would appear, from animal experiments, to be the most advantageous. Intrathecal injections should be supplemented by large doses given intramuscularly and subcutaneously.

Prof. Donati, of Rome, combined with the initial serotherapy subcutaneous injections of phenic acid and a sedative cure with chloral and bromides and even morphine to keep the patient calm. Donati concluded his paper as follows:

A. *Prophylactic treatment of tetanus*.—Surgical prophylactic treatment consists in the appropriate local treatment of the wound; the specific is sero-prophylaxis.

I. Local treatment of the wound:

In every wound where tetanus contamination is suspected, it is necessary to—

- (a) Remove completely and rapidly all the mortified parts or those susceptible to or suspected of modification on account of being contused.
- (b) Remove foreign bodies which are generally the vehicles of tetanus germs.

For this it is necessary to perform the operation immediately or in any case at the earliest possible moment.

The method of excision, followed if possible by a primary suture (immediate or deferred) or otherwise by drainage, has a fundamental importance in order to hinder the development of tetanus.

The antiseptic treatment of wounds thus operated is of secondary importance and can generally be neglected.

II. Specific serotherapeutics:

The preventive injection of antitetanic serum must be made as soon as possible, even in ordinary practice, in the patient who has a suspicious lesion.

If in consequence, phenomena of slight anaphylaxis are observed, these do not constitute any danger and in no way contraindicate the use of the serum. Seroprophylaxis considerably decreased during the war, the percentage of cases of tetanus, and also the number of deaths. In civil life, when seroprophylaxis was systematically employed, tetanus practically disappeared. The prophylaxis is complete when it prevents the appearance of the disease. However, a certain morbidness remains (postserum tetanus), especially by reason of faults in the manner of administering the serum and because of the use of serum which is not active enough. The addition of disinfectants to the serum and the manipulations to concentrate it are the principal causes which diminish the activity.

When the effects of prophylaxis are incomplete, atypical tetanus results, generally, attenuated. It is rare that the prophylactic results are null and allow the development of tetanus of ordinary incubation and unmodified clinical evolution.

When, by reason of incomplete prophylaxis, postserum tetanus develops after a prolonged period of incubation, it is called retarded tetanus. When, on the contrary, the tetanus breaks out after exhausted prophylaxis, after the latent period—besides a period of incubation (which may also be of ordinary duration)—we speak of tardy tetanus. This kind is most frequently the tetanus which develops after operation.

The constant use of preventive injections before the ordinary aseptic surgical operations is not justified. On the other hand, it is necessary before secondary operations of wounds which have been infected for more than ten days.

In the case of traumatic lesions two preventive doses should be injected as soon as possible after the injury and at short intervals. For serious lesions a third injection must be made eight days after the others. The antipoissonous units (U. A.) of antitetanic serum, or those which give immunity (U. I.), are calculated and indicated variously in different countries; it would be better to adopt a world-wide single method.

An increase in the average prophylactic quantity, which is from 1,000 to 1,500 (U. A.) American, in order to make it sufficient for the rare cases of exceptionally serious infections, is neither useful nor practical.

The experiments of antitetanic vaccination made on man by Vallée and Bazy deserve to be repeated, in order to search for a more durable immunity in particularly serious and suspicious cases and in order to prevent the consequences of the eventual migration and permanency of the germs in other tissues or organs.

B. The therapeutics of tetanus.—We do not possess a specific treatment of certain efficacy for tetanus. It is therefore necessary to combine different therapeutic methods, which are suggested by the following considerations:

1. Remove the infection (local surgical treatment and other local treatments).
2. Neutralize the poisoning (specific therapeutical antitoxin (serotherapy) or a specific).
3. Calm or suppress the crises (sedative therapeutics).
4. Keep up the strength and provide for the functional disorders of the different organs by symptomatic treatment.

As it is very important to commence immediately the therapeutic treatment the premonitory symptoms and the tetanus symptoms should be searched for with care at the outset in order to make the early bacteriological diagnosis.

The surgical treatment consists in operating on wounds which are still in a period of evolution when the tetanus declares itself.

The antiseptic medical treatment can be applied to these cases but rather with the object of acting against concomitant infections.

Operating after the symptoms of tetanus have commenced is useless, because it has no effect on the poison which has already entered the nerve cells; however in very acute cases with particularly serious wounds, it is perhaps expedient to operate. This is already rendered advisable up to a certain point by surgical considerations of a general nature on the appearance of tetanus.

Serotherapeutics should not be neglected. Large quantities of antitetanic serum should be injected at an early stage as near as possible to parts already attacked by the poison and where consequently this poison has already spread or may do so (Tizzoni). The curative dose is equal to five times the preventive.

The most clearly indicated means of introduction is the intraspinal; anaphylaxis is especially noticeable in intravenous injections and will be combated by administering adrenaline or chloride of calcium, etc.

Hypodermic injections of phenic acid (Bacelli) in sufficiently large quantities are a good addition to serotherapy, on account of their antipoissonous and sedative action. It is all the more expedient to use them in connection with injections of antipoissonous serum because in cases of average seriousness they can, even when employed alone, give excellent results.

It is necessary to arrive rapidly at the administration of at least one gram (15.432 gr.) per day of phenic acid, a quantity that has often been exceeded. Among the other antipoissonous substances that have been employed against tetanus, the most recommendable seem to be: persulphate of soda, iodine, and perhaps cholesterine.

Sedative treatments are also regularly employed. Chloral, bromide, and also morphia, are the usual medicaments. They should be employed in such quantities that the patient remains calm, without painful cramps, and capable of swallowing and safe from asphyxiating fits.

Under serious circumstances it may be necessary to have recourse to narcotics along or in conjunction with subcutaneous injections of sulphate of magnesia. This substance is rather dangerous and its action, at the present time, is contestable.

Hygiene, good food (if necessary by the rectum or by subcutaneous means), the regularity of the evacuations, promotion of diuresis, the sustaining of the force of the heart, are things that must not be neglected.

Tracheotomy, bilateral phrenicotomy, or phrenic anesthesia, suprapubic cystotomy and gastrotomy are exceptionally employed.

Col. Ashhurst lays stress on the necessity of giving antitoxin in large amounts as soon as possible after the diagnosis is made. He agrees with Cummins as to the superiority of intra-spinal injections and believes that if early and efficient treatment is administered the mortality should not exceed 20 per cent.

Col. Ashhurst's opinion coincided with Prof. Donati's as to the utility of sedatives as an adjuvant. Ashhurst stated in conclusion:

The pathogenesis of tetanus being fairly well established, rational methods of prophylaxis and treatment are possible. Care of the wound (debridement, excision, extraction) is the most important factor in prophylaxis, but second only to it is the prophylactic use of antitoxin. If the latter alone is available, its prompt use may avert or at least postpone and render less severe an attack of tetanus, even when early proper care of the wound is impossible, as often

in military surgery. The unusual frequency during the German war of forms of tetanus rarely seen in civil life (late, chronic, local, and recurrent tetanus) is attributable to the general prophylactic use of antitoxin.

Treatment requires (a) elimination of the source of the toxins (proper care of the wound), (b) neutralization of the toxin already formed, (c) administration of drugs which depress the spinal cord, and (d) nursing the patient. Antitoxins should be given in large amounts as soon as possible after the diagnosis is made. Intravenous administration serves only to neutralize the circulating toxin, and must always be supplemented by intraspinal administration, which has been proved clinically (both in laboratory work and in patients) to be efficient in neutralizing toxin already absorbed into the nerve roots or spinal cord.

If early and efficient treatment is administered, the mortality should not exceed 20 per cent. The author reports 17 personal cases, from civil life, with 7 deaths (41.1 per cent). Among 12 patients where treatment was early and efficient there were only 2 deaths (16.6 per cent).

SMALLPOX IN PORT AU PRINCE, HAITI.

By C. J. BROWN, Lieutenant, Medical Corps, United States Navy (Medical Inspector, Gendarmerie d'Haiti).

On September 22, 1920, three persons with smallpox were isolated at the city general hospital. Two of the three were convalescing. Inasmuch as these people had not been out of Haiti, search was made for the original case, and it was found on September 26, 1920. This individual left Jamaica in August, touched Cuba en route, and entered Haiti at Aux Cayes, August 20, 1920. On August 26 he reached Port au Prince. He showed no evidence of the disease when he disembarked at Cayes, but stated that he "felt sick." He must have been in the incubation period of smallpox when he left Jamaica, at which place the disease was present.

Since that time 3,059 persons have been under treatment with the disease, with a gross mortality to date, in the hospital, of 9 per cent. It is believed that this rate is higher than that of the epidemic as a whole, because many patients are brought to the hospital in a moribund condition, and many mild cases successfully conceal themselves in the city or in the surrounding country.

The first cases were mild, but as time went on they gradually increased in severity, and the mortality rate has slowly but steadily risen.

An isolation camp equipped to handle 350 patients was established at the city hospital. Later, as the number increased, two large un-

occupied foundries were put into commission as convalescent wards to which patients were transferred as soon as the pustular stage was completed. More recently these wards have also been used for the overflow from the tent camp.

I was placed in charge of these camps, under the supervision of Lieut. Commander K. C. Melhorn, Medical Corps, United States Navy, on November 12, 1920, and since then there has been opportunity to observe over 3,000 cases of varying severity, from mild afebrile, trivial eruptions, occurring only on the face and arms, to the severe confluent fatal types of the disease.

There has been little time to go extensively into individual case histories, but short histories and notes have been taken throughout the epidemic and furnish the basis for the following observations.

Individuals of all ages are susceptible, from the new-born infant to the aged man of sixty. The sexes are evenly divided; at the time of this writing 1,694 men and 1,365 women have been under treatment. Most of our patients are in the third decade of life. Those living under poor hygienic and economic conditions are more prone to acquire the disease than are those of the better class, whose homes are cleaner and less congested, and whose living conditions are better.

Clinical course of the disease.—The onset is acute, without premonitory symptoms. There is fever of three days' duration, after which papules or maculo-papules appear on the forehead and a few hours later on the arms, then on chest, abdomen, and legs. Maturation takes place in the order in which the eruption first appears, passing successively through the stages of vesicle, pustule, and crust. Dessication begins about the twelfth or thirteenth day, on an average, and is usually completed in three weeks—longer in severe cases. During the change from vesicle to pustule there is an accession of fever.

The incubation period.—This is about fourteen days. It has been possible to verify it in several instances, as follows:

(a) O.—B.—, a hospital corpsman, was assigned to duty at the camp. Fourteen days later he had fever.

(b) D.—, a laborer, entered the camp to work. Fourteen days later fever began.

The onset.—Fever always marks the onset and is preceded in seventeen per cent of the cases by a chill of one-half to two hours' duration. Headache occurs in 60 per cent. Thirty-four per cent have pains in the back or limbs, six per cent have vomiting. Sore throat and pain in the abdomen are other initial symptoms. The severity of these first symptoms rarely bears any relation to the intensity or virulence of the disease. Confluent smallpox sometimes follows fever of a day's duration, with no associated symptoms. Con-



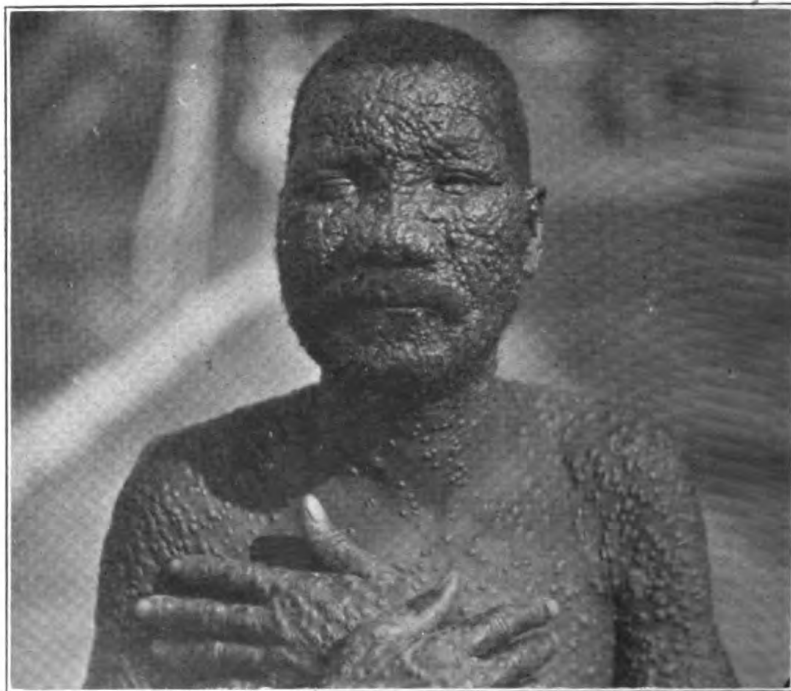
Papular stage.



Some of the serious cases have very small papules.



Vesicular stage with umbilication.



Vesicular stage with umbilication.

versely, severe initial symptoms of three to five days' duration may precede an insignificant eruption, which matures and disappears in twelve days. Initial rashes have not been seen.

The preliminary fever lasts three, four, or five days, usually three, although a few instances of one, six, seven, eight, and nine-day fevers have been noted.

The discrete form.—Shortly after or coincident with the drop in temperature the eruption appears, first on the forehead or cheek in the majority of cases, but occasionally on the arms or scrotum. It next appears on the forearms, then on the legs and trunk. It is always most abundant on the face. Next in order are the flexor surfaces of the arms and the extensor and inner surfaces of the thighs. It is least abundant on the chest, abdomen, and back. Then, in order of its first appearance, the eruption passes through the vesicular to the pustular stage, which is usually reached on the tenth day. The vesicles are umbilicated with a zone of reaction about them which is particularly marked in mulattoes. The papules appear usually on the fourth day after the onset of the primary fever, change into vesicles on the seventh or eighth day, into pustules the tenth, and into crusts on the twelfth or thirteenth. There is considerable variation here. Pustules may appear as early as the sixth and as late as the seventeenth day. Vesicles may appear on the sixth day, rarely after the eleventh.

The lesions are sometimes healed on the face before the pustular stage is completed on the legs. Maturation is most rapid on the face, whereas on the legs it proceeds more slowly. The severity of the disease is directly proportionate to the number of pocks on the face. The onset of the pustular stage is marked by considerable swelling about the lesions and by a change in their color, which is quite evident in spite of the black skin. In this form the disease does not cause much discomfort until the pustular stage is reached. The pustules, with the accompanying swelling, cause much distress, and are especially painful during their maturation on the legs and on the soles of the feet. They vary greatly in size, in some cases attaining a diameter of half an inch. At this time the fever, which is slight or absent in the interval, recurs, the patients feel sick, and complain of pain and malaise. The temperature may rise to 104°, with a very rapid pulse.

Desiccation is rapid, is first completed on the face, and lastly on the feet, and is usually finished during the fourth week. The black crusts on the soles of the feet come away very slowly.

The confluent form.—Practically all of our fatalities occur in this class of patients. It is usually possible to predict in the papular

stage the future confluence of the pocks. The face is swollen, sometimes to half again its normal size, and is studded with papules which coalesce as they mature. As a rule, the smaller the vesicles the more numerous they are, and the greater is the virulence of the disease. The most severe cases have been those in which the diameter of the vesicles was no greater than that of a pinhead, a tiny black spot marking the bottom of the umbilication. These are the cases which, overcome by the intense toxemia, die before the pustular stage is reached. In the confluent form, with the closed eyes, the edematous protruding lips, the swollen face, the tongue covered with pocks, and the severe pain, the patients are intensely miserable. Pustules appear on the conjunctiva, even on the cornea, with a purulent conjunctivitis. The roof of the mouth, the soft palate, the tongue, the tonsils, and the pharynx are covered with pocks, and these, combined with the dry mouth, practically preclude the taking of any nourishment. The voice is hoarse, and may be lost. The limbs are swollen and tender, and every move is torture. Fortunately, this very acute stage does not last more than four or five days. Then the swelling diminishes, the voice is better, the pain abates, and the patient is more comfortable.

Following this, the forehead, nose, and cheeks are covered by a thick yellow crust, which, as it is cast off, may leave scattered bleeding points. On the legs, secondary infections are very liable to occur, and sometimes leave many rounded, punched-out ulcers, thus greatly prolonging the period of convalescence. Local gangrene may occur.

Confluence does not take place to any extent on the trunk, and when it does there is merely fusion of four or five vesicles.

The vesicular stage is sometimes prolonged beyond the time during which the change into pustules usually takes place. The patient is overwhelmed by the toxemia early in the course, and the vesicles persist for the five or six days preceding death with scarcely any change other than a slight increase in their size. It may be that the maturation of the eruption depends upon the presence of a certain amount of resistance; this failing, it does not progress normally, as to the time element, into the pustular stage.

A prominent feature of the confluent cases is the markedly disagreeable musty odor, which is very characteristic and highly penetrating.

During desiccation, which is much more slow than in the discrete form, large crusts 2 or 3 inches in diameter may be cast off, and in one case a perfect mold of the heel and calf of the leg came away.

Complications. Several of these have already been mentioned. The most common complication is a series of ulcers of the lower legs,



Swelling and ulceration of leg late in pustular stage.



Same case. Note relative scarcity of lesions on chest.



Discrete form. Pustular stage. Umbilication on face and hands.



Late vesicular stage with marked swelling of face.

699

due usually to secondary infections of the pustules. They are very obstinate and greatly lengthen the period of isolation. One recent case had 43 ulcers, of a punched out appearance, scattered over the body from the waist down. These ulcers sometimes come together to form one larger irregular ulcer.

Boils and abscesses occur in various regions. The latter are quite frequent in the breasts of the women, and are accompanied by great swelling and pain. Occasionally the breast swells to twice or three times its normal size, later subsiding without having exhibited fluctuation or pain. One *man* had an abscess of the left breast. Small boils and abscesses of the scrotal and gluteal regions are common, and when in the former region may cause great edema of the scrotum and terminate in gangrene.

Edema of the legs and feet is quite common. In some instances it begins during convalescence or toward the end of the pustular stage and persists, while in others it is inflammatory, accompanies the acute stage only, and then rapidly subsides.

Broncho-pneumonia has occurred as a terminal event in a few cases.

Several patients have been carried off by a profuse diarrhea, sometimes associated with edema. This diarrhea does not respond to the ordinary remedies.

The laryngitis attendant upon the presence of pocks in the larynx may lead to complete aphonia with much dyspnea.

All varieties of ocular inflammation have been seen. Panophthalmitis occurred in one fatal case. Great edema of the lids may close the eyes, and in several instances was followed by large abscesses of the upper lids.

There have been several abortions, and several full-term deliveries in the tent camp. The full-term infants have all survived. A Haitian doctor in charge of the maternity ward reported an infant born with the disease, and more recently two children, each a week old, were admitted during the vesicular stage of smallpox.

The number of pocks on the face, as Osler pointed out, is an index of the severity of the disease. When the acute stage has passed, the eruption on the feet furnishes the criterion by which patients are retained or discharged. If the feet are clear it can be assumed that desquamation is complete.

Relation of vaccination to the disease.—With very few exceptions no one successfully vaccinated before the onset of the incubation period has acquired the disease.

We have had "takes" in those who were vaccinated on the sixth, tenth, eleventh, and twelfth days of the period of incubation.

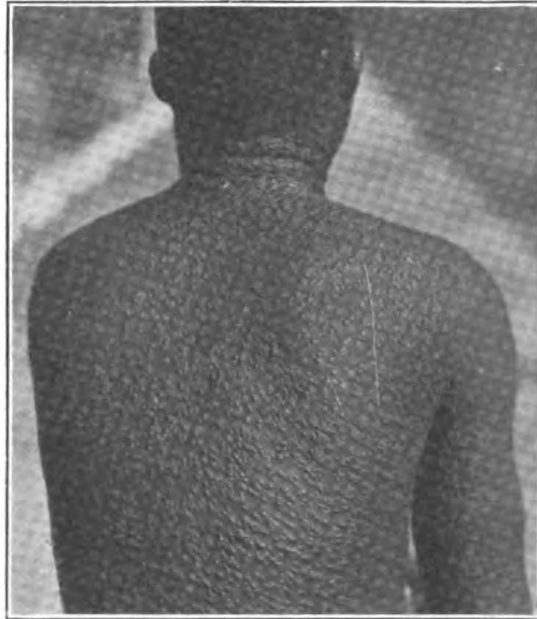
Of 15 persons with smallpox, 3 were vaccinated on the sixth, 1 on the ninth, 3 on the tenth, 6 on the eleventh, 1 on the twelfth, and 1 on the thirteenth day of the period of incubation.

All cases of smallpox occurring in those who had "takes" have been mild, but the number has been too small to draw any conclusions therefrom.

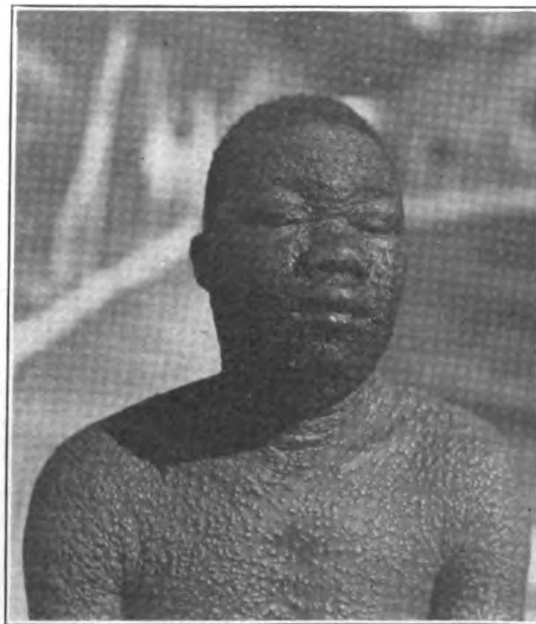
In several instances, when a "take" was finally obtained, activation of previous unsuccessful vaccinations occurred.

I have vaccinated smallpox patients in different stages, from the fourth to the thirty-third day after the onset of the primary fever, with negative results in every instance, indicating that during this period they are immune to cowpox. From these facts the conclusions may be drawn: (1) That vaccination may prove successful when performed as late as the twelfth day of the period of incubation, running its course with that of smallpox, but in no way influencing the course of the eruption; (2) that vaccination performed after the sixth day of the period of incubation does not influence the course of the disease, and (3) that a patient is immune to cowpox from the beginning of the eruption to the end of desquamation.

Treatment.—Lacking a specific, the only indications in the way of treatment are to make the patient as comfortable as possible during the acute stage, to combat the toxemia, and to prevent the complications. Many need no treatment, and are up and about even during the acute pustular stage. Each patient receives a daily bath, without friction. This is sometimes supplemented in the confluent cases by frequent spongings with a dilute bichloride solution. One-half per cent phenol is useful. A gauze mask, saturated with an antiseptic solution, is a great comfort during the acute stage, when the face is swollen and painful. Later, when the crust forms on the cheeks, nose, and forehead, an ointment is used to soften it. A simple mouth wash is used for those with stomatitis, and Dobell's solution for the pharyngitis. When the pustules are near the eyes boric acid solution is dropped into the conjunctival sac four times daily. Copious drafts of water and frequent catharsis reduce the amount of toxemia. In the severe cases stimulation is begun early and is continued until the patient is convalescing. Patients are warned not to pick at the lesions but this advice is not usually heeded, so that many secondary infections result. For the ulcers, simple cleansing with an antiseptic solution, followed by drying and the application of a dusting powder, does most good. When desquamation is practically complete, except for a few adherent scabs on the feet, the patient is allowed to lift them off. Ointments are used very little; they catch much dust, and in no way do they shorten the period of convalescence.



Haitian smallpox. Beginning confluence on the back.



Pustular stage with confluence of lesions.



Desquamation. Crust formation about the nose.



Desquamation.

**MEDICAL DEPARTMENT OF THE UNITED STATES NAVAL TORPEDO
STATION, ALEXANDRIA, VA.¹**

By C. C. KRESS, Lieutenant Commander, Medical Corps, United States Navy.

The health of the personnel has been excellent for the entire year of 1920. The food is of the best quality. The station is supplied with excellent drinking water, pumped through pipes from the deep well of the Mutual Ice Company's establishment, next door, to the sanitary drinking fountains about the station. Water for the lavatories is city water, which is obtained from Cameron Run Creek and filtered at a private filtration plant. This water is of very good quality, as shown by the reports of the city health office, and is sufficient in quantity.

The drainage of the station is excellent, with the exception of Union Street, between King and Cameron Streets, one of the principal passageways of the station. In bad weather this part becomes flooded and very muddy, constituting a physical obstacle to traffic and a menace to health. In previous reports improvement in this street was recommended, but nothing has been done, because there is a division of responsibility for its condition. The railroad officials will assume responsibility for an area within a certain radius of their tracks, and the city of Alexandria for the balance of the street, but each waits for the other to commence operations.

The electrical conduits on the first floor of the assembly building are now being connected with the sewer. This, with the construction of surface drains about the buildings, has eliminated the dampness which has become noticeable on the floor. The buildings of the station, two in number, are located on the banks of the Potomac and occupy a block and a half at the foot of the main street of Alexandria, a city of 30,000 people.

The level of the station is about 5 feet above the highest high-water mark. The situation is excellent, with a splendid dock and water front, a fairly good railroad siding, and the Washington-Virginia Electric Line, within two blocks from which a now unused siding runs to the station.

The construction of the floors about the station is faulty. The Belgian or creosoted blocks are set upon concrete without any filler. This leaves the blocks loose, so that by a block working up above the level people are frequently tripped. A great deal more effort is required in drawing a small truck over this irregular surface than should be necessary. In the crevices between the blocks debris, more or less saturated with expectoration, collects in spite of the efficient manner of disposal of sputum by burning in paper dishes

¹ Abstracted from the Annual Sanitary Report to the Surgeon General, January, 1921.

filled with sawdust. In these crevices important tools are lost, and much time is spent renewing lost articles. The wooden blocks make an excellent, resilient, warm surface for the men to stand upon, but none of these good features would be sacrificed if a coating of tarvia or some similar substance were applied to the blocks.

The ventilation of the building is excellent. Many obstacles have arisen in this connection as the station developed, but each has been overcome. Iron ventilating hoods with exhaust blowers have been constructed over the tinning plant and the blacksmith's furnace. At all points where dust, poisonous gases, or acids are employed, exhaust ventilation is supplied.

On the first floor of the assembly building oil was being used to lubricate the tools in the turning processes, and its burning at times fills the compartment with smoke, and an amount of gas having eventually an untoward effect on the health of the men working in it continuously. A substitute for the oil has been utilized, and this defect in the health conditions corrected. The heating is ample.

The lighting of the station as originally designed is very satisfactory. No permanent, adjustable control of the direct rays of the sun is furnished the side walls of the buildings, which are constructed of glass paneling. Green water-paint applied to the inner surface of most of the panels on the south side of the buildings, and to a sufficient number of panels at other points, has met some of the objections to this excess of light, and to a very limited extent to the excess of heat rays in hot weather. It is understood that this painting of the glass walls is a routine practice at other plants, but it certainly is not adjustable or efficient on very cloudy days when, because of the obstructing paint, the central portions of the station becomes dark enough to require artificial illumination. Complaints have been received from several employees and clerks regarding the glare of the sun on metal or paper. Roller shades installed on the interior of the glass panels, is one means of correcting this lighting defect, and allows adjustment of the light. Awnings installed on the south side of the entire station and other sides of the offices, in summer, would correct the excessive light and heat at the same time. Awnings were approved for the dispensary late in the summer last year, but were not delivered. Here the heat and light were so intense that this request for awnings was fully warranted. The expense of installation and upkeep of durable roller shades in all seasons, and for awnings in summer, will be more than justified by the benefit to the employees in preventing eye strain and occasional cases of heat exhaustion which reduce production.

A permanent lunch room is badly needed. A site has been selected on the fourth floor of the assembly building near the dispensary, and

certain preparations have been made. The temporary lunch room should be done away with as soon as practicable, as it is impossible to handle food and dishes properly for the steadily growing requirements with such poor facilities as are at present installed. The new lunch room should be constructed from the floor up, conformably with the highest modern standards, as befits a highly developed organization. The floor should be surfaced with tile, or the new flooring material, which is a mixture of cork and cement—a linoleum-like substance—a surface easily cleaned up, and should have rounded corners and baseboards. The cooking and dish-washing machinery should be carefully selected. The kitchens should be located next, well screened from flies and ventilated by exhaust blowers to prevent odors and smoke from entering the building. The lunch room proper should have the advantage of the light and ventilation which the rest of the building possesses, and, therefore, should not be partitioned off by more than a rail, or a six-foot screen, thus allowing light and air to circulate freely. It has been noted that the acoustic properties are excellent on the fourth floor, and the suggestion is made that the lunch room be built with this in mind, in order that this space may also be utilized for giving health talks, picture exhibitions on hygiene, and for various entertainments.

The marine quarters are very satisfactory in all respects, being located within three and one-half blocks of the station, on Duke Street, between Fairfax and Lee Streets. The quarters are a regular house or dwelling, in a high part of town, with good drainage. It is a three-story brick house with concrete cellar, hot-air heat in sufficient quantity, and plenty of hot water for bathing and for scrubbing clothes. There is plenty of room for the men, a good brick outhouse for shower baths and scrubbing clothes, and a pleasant grass yard, the rear of which is equipped for sunning and drying clothes. The men get their meals elsewhere. It is recommended that a sentry box, provided with heat and windows for observation, be installed on the platform of the assembly building for the use of the marine sentry on watch.

The testing barge lies secured to the dock for the winter months. This barge, with its tender, was received late in June, 1920, and is equipped to house and feed 136 enlisted men and to fire torpedoes either beneath or above water. During the summer months it is planned to anchor the barge off Piney Point, Md., on the torpedo range, 60 miles down the Potomac, and to test out torpedoes, during which time a pharmacist's mate will be on board to take care of emergency accident work, a small sick bay being provided on the upper deck with toilet and lavatory accommodations. A market boat capable of making twenty knots will make regular trips to the

city for mail and provisions. This will constitute a three-hour trip for a serious case going to hospital, unless its urgency require the employment of a sea sled to make faster time. There are two sea sleds, seven ten-knot torpedo retrievers, and eleven signal rafts in connection with the torpedo range service. At present the personnel consists of 77 men, half of whom are men of long service. Eighteen of this number are chief petty officers. Conditions on board are excellent. First-aid lectures are given occasionally by the medical officer. Recreation and liberty are freely given. Public spirited citizens in the city of Alexandria have extended every courtesy to all the men attached to the station, and in every way aided in providing for their recreation and comfort.

The dispensary is now finished, with the exception of the oak dispensing cabinet which is now being completed. The necessity for a proper chair and light to give delicate eye and nose treatment and make examinations has been felt for some time. An improvised specialist's chair, with head rest and adjustable light, is being used fairly satisfactorily in the darkened X-ray room. The X-ray machine is now in successful operation and it is believed that while only having a capacity of ten milliamperes, even pelvic fractures can be rayed by the use of highly sensitized films. For ordinary emergencies this machine is very satisfactory. The Ford ambulance has just been overhauled. A sound-proof booth, after the pattern of a telephone booth, should be provided for dispensaries located in factory buildings, to permit proper physical examination of applicants.

No illness directly attributable to conditions existing within the station has arisen. Of course, as the station increases in personnel and complexity, the hazards of illness and injury will increase. Most of the injuries have been of a minor nature. Care, forethought, and instruction will prevent most injuries. It is often an injury which brings observation to bear on the need of a safety device, as when, the other day, one of the men stepped upon a large steel shaving which had fallen from a lathe and which twisted up behind his foot, causing a deep wound which severed the tendo Achillis. The tendon was sutured at the dispensary and the leg has healed with good results. This accident drew attention to the need for careful supervision of the sweeping out of the lathe scraps and a means has now been discovered by which the scraps will be prevented from reaching the floor. Numerous safety devices have been installed and more are in preparation. A filing system to keep account of the sickness and injuries within the station, combining the methods approved and made standard for civilian industrial establishments by the United States Public Health Service (see Plan A, Reprint No. 573, Public Health Reports), and those in use at the navy yards, is being put into operation at this station. A thorough system of tracing illness

and disability is a great aid to the authorities in their management of affairs. Any system which can be made use of to show increase in production and efficiency is worthy of special effort and itself stimulates efficiency. Industrial hygiene has now become one of the principal duties of the naval medical officer ashore, under the Compensation Law now in effect.

It is hoped that as the station progresses in capacity, some provision for recreation will be made. A field of such proportions that any sort of sport may be indulged in is very difficult to secure in this locality, and such a piece of ground near the station would be of infinite benefit to the health of the personnel. In Alexandria no permanent facilities exist for gymnasium or outdoor sport. Provision of some floor space for dancing, entertainments, and indoor athletics is greatly desired. A recreation league has been organized which includes both civilian and enlisted personnel. A baseball team has been organized which aids greatly in getting the men together, increasing station spirit and bettering conditions in the station as well as the health of the men. Health talks during the noon hour by the Y. M. C. A. representative, Mr. Wallis, have had good results. A course of weekly lectures has been arranged by Mr. Wallis to be given at the noon hour during Lent by interesting and representative ministers.

No summary of the health conditions of the station would be complete unless a study of the conditions existing in the surrounding neighborhood were made. The aid of the Public Health officer was offered and taken advantage of in the comments which follow. No accurate record of health conditions had been kept in this city until the accession of the present full-time health officer in the latter part of 1918. It is all important to note that the period of great improvement of conditions in this city coincides with the origin and development of the station, which allowed a high average of efficiency due to good health and increasing attractiveness of the community to the incoming employees, most of whom were from different localities and had to be acclimated. Had the station been in full operation in the early part of 1918, when an epidemic of typhoid fever was in progress in Alexandria, less fortunate results would have been obtained.

When the present full-time city health officer took charge here in the latter part of 1918 he found 1,240 dry privies in use in the city limits. There are less than 300 now. In the past six months 40 privy wells in the basements of houses in the city have been abolished; 99 sewer connections have been made, and 82 can-type boxes have been removed and replaced by sewer connection. The examination of school children, the inspection of milk and food, venereal treatment and free treatment to the poor have accomplished untold good.

The following tables illustrate some of the features of health conditions in Alexandria, Va.:

Typhoid record for 1918, 1919, 1920, Alexandria, Va.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1918...	(¹)	(¹)	(¹)	(¹)	(¹)	32	34	20	36	(²)	(²)	(²)	Over 200; deaths, 13.
1919....	4	6	8	3	7	19	14	10	10	1	1	1	83; deaths, 8.
1920...	1	0	0	6	11	2	0	7	7	3	2	0	40; deaths, 4.

¹ Typhoid epidemic; no records filed.

² Influenza epidemic; no records kept of typhoid.

Smallpox record for 1918, 1919, 1920, Alexandria, Va.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1918....	0	0	0	0	0	0	8	1	0	0	0	0	9
1919....	1	2	4	9	1	0	0	0	0	0	0	0	17
1920....	0	2	1	0	1	0	0	0	0	0	0	0	4

Comparative report of all communicable diseases for 1919-1920 in Alexandria, Va.

	Jan.		Feb.		Mar.		Apr.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		Total.		Deaths.		
	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919	1920	
Typhoid.....	0	1	4	0	5	0	8	4	3	14	7	2	19	0	14	7	11	7	10	3	1	2	1	0	83	40	8	4	
Scarlet fever.....	1	3	0	0	0	0	0	2	1	3	0	0	1	0	1	1	3	0	11	0	2	3	0	0	27	14	1	0	
Diphtheria.....	0	0	0	0	0	0	1	1	2	0	0	0	0	1	1	1	2	1	5	2	0	4	3	2	4	21	8	3	
Tonsillitis.....	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0	4	0	3	2	0	4	5	4	10	13	0	0	
Pneumonia, all forms.....	0	17	0	14	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	2	1	3	2	3	4	42	37	10	
Influenza.....	0	182	0	32	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	0	0	0	0	1	0	9	1	0	
Vincent's angina.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	3	5	10	1	0	
Measles.....	0	0	0	1	0	0	1	1	0	1	0	3	0	0	1	1	0	0	0	0	0	0	0	2	3	5	10	1	0
Mumps.....	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	3	0	17	1	0	4	59	0	0	
Malaria.....	0	0	0	0	0	0	0	0	0	0	0	5	1	2	0	0	0	1	0	1	4	1	0	0	4	14	0	0	
Chicken pox.....	0	3	15	9	12	5	2	0	0	6	0	6	2	0	0	0	0	0	1	3	2	9	6	16	40	59	0	0	
Smallpox.....	1	0	2	2	4	1	9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	4	0	0	
Tuberculosis, all forms.....	0	4	3	0	0	0	2	2	0	0	2	2	1	2	1	1	1	0	1	3	2	2	2	1	12	18	29	31	
Infantile paralysis.....	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
Spinal meningitis.....	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	2	0	0	
Whooping cough.....	0	0	0	0	0	0	0	0	0	0	0	7	0	4	0	2	0	0	2	0	0	0	0	0	0	1	36	2	1
"La grippe".....	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	107	1	0	
Anthrax.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Syphilis.....	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	55	34	.....
Gonorrhea.....	0	6	0	3	0	0	0	6	0	0	0	6	5	12	6	3	5	2	26	7	17	39	15	3	128	113	.....	.....
Chancroid.....	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	2	1	0	0	5	4	.....	.....

¹ No reliable records previous to July 1, 1919—cases not reported. Health department organized July 1, 1919—all diseases more fully reported. The 1920 record is practically all and complete for all diseases.

THE HERMAN-PERUTZ REACTION.**COMPARISON OF RESULTS WITH THE WASSERMANN REACTION IN 100 CASES.**

By G. V. GENEMER, Lieutenant, Medical Corps, United States Naval Reserve Force.

This test, which is a modification of an older test of Porges, is so simple and the results so easy to read that it can be performed on shipboard or anywhere else where there are not the facilities for doing the Wassermann.

Two solutions are used for the test:

SOLUTION A.

Sodium glycocholate	2 grams.
Cholesterin	0.4 gram.
95 per cent alcohol	100 c. c.

At time of making the test this solution is diluted 1 to 20 with distilled water.

SOLUTION B.

A fresh 2 per cent aqueous solution of sodium glycocholate.

The patient's blood is obtained as for the Wassermann, or enough can be obtained from puncture of ear or finger. Use 0.4 c. c. of clear serum. The serum must show no hemolysis and does not need to be inactivated. To 0.4 c. c. of the clear serum add 0.2 c. c. of the 1 to 20 dilution of solution A and 0.2 c. c. of solution B.

Shake thoroughly, plug tubes with cotton and allow them to stand 18 to 24 hours at room temperature. A positive result is indicated by a flocculent precipitate and may be expressed as 1+, 2+, 3+, or 4+, depending on the degree of precipitation. A negative result is shown by no precipitation.

[From Webster's Diagnostic Methods.]

Wassermann.	Number of cases.	Herman-Perutz.
Negative.	52	Negative.
++++	17	++++
+++	7	+++
++	6	++
+	3	+
	3	+++
	3	++
	2	++
	1	+
++++	3	Negative.
+++	2	Negative.
++	1	Negative.

This test is not as delicate as the Wassermann test, especially in cases of latent syphilis and in treatment cases, but never gives false positives.

A positive result indicates syphilis, while a negative does not exclude syphilis.

In an article in the July number of the U. S. NAVAL MEDICAL BULLETIN the directions for this test called for using equal parts of solutions A and B in full strength.

These solutions when mixed will often cause precipitation without the addition of patient's serum. This never happens when a 1 to 20 dilution of solution A is used according to the above technique from Websters' "Diagnostic Methods."

47720—21—14

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

"Yea, very grave men and Docters of the liberall Professions, are so forward to rush into these Olimpick games, for gayning the prise from others, as they seeme rather to affect the writing of many and great, than iudicious and succinct bookes, so as theire riper yeares and second Counsell (alwayes best) hardly suffice to correct the errours thereof, and change (as the Proverbe is) quadrangles to round formes." Fynes Moryson.

AIR SICKNESS, by René Crutchet, professor of medicine in the University of Bordeaux, and René Moulintier, naval surgeon, sometime professor of naval hygiene in the University of Bordeaux, translated by J. Rosslyn Earp, M. A., M. R. C. S.

THE MEDICAL EXAMINATION OF AIRMEN, by Dr. Maublanc and Dr. Ratié, of the Châtres School of Flying, translated by Norman Ball, M. R. C. S., L. R. C. P., late R. A. M. C. William Wood & Co., New York, 1920.

These companion volumes merit the careful study of every medical man in any way connected with aviation. In the foreword to "Air Sickness" the characteristic phenomena are emphatically denominated physiological, not pathological. In themselves they are trifling, but developing in those who, either at a great height or only a few feet off the ground, must exercise the nicest control of a flying machine, they assume enormous significance. The symptoms developing during ascent and descent and at landing are summarized and then studied in detail. Air sickness and mountain sickness resemble each other. The vasomotor disturbances are the diagnostic point. These are constant and important in flight at high altitudes and are ascribed by the authors to the element of rapidity of motion. The minimum altitude for air sickness is put at 800 meters. Fatigue, however, makes it possible for serious disturbances to develop at lower altitudes. Fatigue is a subjective sensation and difficult to estimate. Its

analysis and estimation by a definite method is exhaustively discussed. Following this the subjects of cold, emotion, oto-rhinol-pharyngeal defects, speed, and the influence of wind are taken up. Finally come paragraphs on training and overwork and a chapter on air hygiene.

The "Medical Examination of Airmen" is less satisfactory because it treats a more extensive subject much more concisely. The constitution and family history and the grosser lesions of heart and circulation, etc., are assigned unnecessary space, while the highly technical and more difficult questions of "recording reaction periods to sensory impressions" and of "recording reaction periods to variations in equilibrium" are condensed to a point that makes the methods somewhat difficult to understand for those, at least, not already familiar with this line of work.

PUBLIC HEALTH CHEMICAL ANALYSIS by *Robert C. Frederick, analytical assistant in hygiene Royal Naval Medical School and Royal Naval College, Greenwich, and Aquila Forster, Ph. D., M. Sc., A. I. C., research chemist, Royal Arsenal, Woolwich, etc.* Constable and Co. (Ltd.), London, 1920.

A concise, practical handbook of the laboratory methods employed in the testing of air, water, milk, butter, margarine, cheese, flour, sugars, condiments, baking powder, metallic poisons in foodstuffs, etc. The language is clear, the type excellent, and the bulk of the illustrations appropriate and satisfactory.

GENERAL PRACTICE AND X-RAYS by *Alice V. Knox, M. B., B. Ch., and Robert Knox, M. D., C. M., M. R. C. S., L. R. C. P.* A. and C. Black (Ltd.), London, 1921.

A useful little book for the general practitioner who may desire a brief and not too technical outline of the present place of X-rays in diagnosis and treatment. The practitioner who has not followed closely the increasing contributions of the specialist in roentgenology to medical and surgical knowledge will find this volume a considerable help in the diagnosis and management of cases he is called upon to treat. The possibilities, probabilities, and limitations attending employment of X-rays in the principal fields of usefulness so far developed are briefly and conservatively mentioned. The reader should profit particularly by the remarks which relate to preparation of the patient for his visit to the roentgenologist's consulting room.

The plate reproductions are excellent and present very clearly the diagnostic points chosen to illustrate the text. The final chapter of the book devoted to electricity and apparatus is of doubtful value, since it is hardly complete enough to give an untrained reader much practical knowledge of the subject, and anyone who is actually working with X-rays would scarcely have use for the elemen-

tary information relating to induction coils and tubes belonging to an earlier period.

PATHOLOGICAL PHYSIOLOGY OF INTERNAL DISEASES by *Albion Walter Hewlett, M. D., B. S., professor of internal medicine, University of Michigan.* D. Appleton and Co., New York, 1921.

We fully agree with the author's postulate that there is a demand for a book of this kind in the medical college to bridge "the gap between physiology and biochemistry on the one hand and clinical medicine on the other" and that students as well as teachers feel this need. We may be very ignorant or merely hypercritical in objecting to the title as somewhat contradictory, having been taught to distinguish between physiological processes and pathological processes, but clinical pathology would seem to be a better title since the purpose of the book is to study altered function by chemical and physical methods rather than from the standpoint of altered anatomical appearances.

This is the day of too many books; of books that will probably sell to the students of some particular professor because he wrote them; of books written by men who know their subject but lack the gift of expression and the training necessary for clear exposition. Dr. Hewlett's book is a marked exception. The author writes well. He is as easily understood when discussing immunity and theories of anaphylaxis as in giving some simple outline of circulatory or digestive function. The volume is enriched by classified references to the current literature. The references to German sources bear a date antecedent to the war.

In its general get up the book is also admirable with its large bold face headings and smaller subheadings, excellent type and good paper and many appropriate diagrams.

DERMATOLOGY, by *Walter James Highman, M. D., associate professor of dermatology, New York Post Graduate Medical School and Hospital.* Macmillan and Co., New York, 1921.

In a work of 500 pages the author claims to present his subject without trying to build up a reputation for learning by all those elaborations and refinements which confuse the student when he takes up one of the most perplexing specialties. Still he is unable wholly to free himself from traditional forms and the speculative and controversial peeps out here and there in a way that can have no interest to the novice. To write for the novice and the novice only is something few people have the courage to do. The novice wants and is perhaps best guided at first by *ex cathedra* statements from a man who does not hedge or heave anchors to windward.

It would appear that only a civilian clientèle is contemplated, and one of private practitioners at that, for while we are told under pediculosis that disinfection of clothing is difficult there is no hint of how to do it as if the author had thrown his war experience behind him, though the paper on which his words are printed shows that the publishers have not. We can not see the propriety of referring to tattooing under pigmentary diseases and the useless line "Tattooing is well known by all," standing entirely by itself, will doubtless be eliminated in the next edition. All but one or two of the numerous illustrations are good—unusually good—but they are often at a distance from the text, in one case 18 pages away.

RATIONAL TREATMENT OF PULMONARY TUBERCULOSIS, by *Charles Sabourin, M. D.*
Translated from the sixth revised and enlarged French edition, F. A. Davis Co., Philadelphia, Pa., 1921.

The author's charming style—easy, simple, and clear; his breadth of view, his long experience, combine to make the present volume at once delightful and instructive reading. The translating has been done with unusual skill.

EYE, EAR, NOSE AND THROAT NURSING, by *A. Edward Davis, A. M., M. D., professor of diseases of the eye in the New York Post Graduate Medical School and Hospital and Beaman Douglas, M. D., professor of diseases of the nose and throat in the New York Post Graduate Medical School and Hospital.*
Second Edition. F. A. Davis Co., Philadelphia, Pa., 1921.

This book contains a mass of valuable information for the class of readers it aims to instruct and the meaning is clear in spite of numerous crudities of expression. The illustrations in the portion devoted to the eye are poor, and there are none at all to illustrate the anatomy of the organs discussed—a serious omission.

OPTIMISTIC MEDICINE, by *A Former Insurance Man.* F. A. Davis Co., Philadelphia, Pa., 1921.

This volume, written in pleasant gossipy style, with many anecdotes, old and new, and an agreeable undercurrent of humor, will provide agreeable light reading for physicians, and abounds in good advice and sound common sense. The purpose of the book appears to be the rapprochement of physician and patient during the period of the latter's health. There is a glossary at the back, but the readers who need to be told what is meant by "atmosphere," "diagnosis," "injudicious," "mental," "perverted," "prudish," "vitality" had best provide themselves with an unabridged dictionary of the English language.

THE CONTROL OF SEX INFECTIONS, by *J. Bayard Clark, M. D., F. A. C. S.* The Macmillan Co., New York, 1921.

Except in the matter of the title, which is not a fortunate one, and except for the fact that like all recent writers on this topic the author omits any reference to the pioneer work in this field carried on by the Navy for 15 years before the war (it affords a striking commentary on how slowly a people awakes to its duties and opportunities), we have only praise for this very readable and concise little volume. It is calculated to do good, and can not be too widely read. It is written for the layman and the physician. It says enough and not too much.

Of particular importance are the ideas advanced in regard to man's obligations to society, not only in the too brief chapter so designated, but in Chapter II, "Underlying Causes of Sexual Diseases." Dr. Clark takes an unusually broad view of our situation and its problems, suggests no short cuts, no superficial remedies for the evils that beset us, recognizes that great results only attend comprehensive, widespread, intelligent, patient effort based on a profound understanding of human nature.

Again, the limitations as to time and topics in the sex education of children seem eminently wise. Here, too, the writer is conservative and rational.

DIAGNOSTIC AND THERAPEUTIC TECHNIC by *Albert S. Morrow, A. B., M. D., F. A. C. S.* Third Edition. W. B. Saunders Co., Philadelphia, Pa., 1921.

A comprehensive work of about 900 pages and 892 illustrations, mostly original, dealing with the mechanical procedures incident to diagnosis and treatment. These procedures are usually omitted from general works on surgery and medicine as too simple and elementary or else as foreign to their purpose. Two chapters are devoted to anesthesia, one to blood pressure, one to transfusion, one to the Carrel-Dakin technique, one to exploratory punctures in various parts of the body, one to aspirations, etc. There are 23 chapters in all. Such subjects as the ear, the larynx and trachea, the esophagus, the stomach, the bladder, etc., are treated each in a chapter to itself.

PRACTICAL PSYCHOLOGY AND PSYCHIATRY, by *C. B. Burr, M. D.* Fifth Edition. F. A. Davis Co., Philadelphia, 1921.

A small volume of 269 pages intended "for use in training schools for attendants and nurses and as a ready reference for the practitioner."

Part I, Psychology, discusses the processes of thought, emotion, volition, etc. Part II is devoted to symbolism in sanity and insanity. Part III defines insanity, discusses its causes, and discusses the cardinal symptoms of the classical types. Part IV is devoted to medical treatment and nursing.

This little work should prove valuable in the field for which it is intended. It is written in plain English, which is more than can be said of the majority of modern works on psychiatry. These are practically unintelligible to the average medical man.

○

3

VOL. XV

NO. 4

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

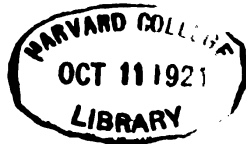
ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
CAPTAIN F. L. PLEADWELL, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

OCTOBER, 1921
(QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1921



May 1921

NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 3, July, 1918.

SUBSCRIPTION PRICE OF THE BULLETIN.

Subscriptions should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C.

Yearly subscription, beginning January 1, \$1; for foreign subscription add 35 cents for postage.

Single numbers, domestic, 25 cents; foreign, 31 cents, which includes foreign postage.

Exchange of publications will be extended to medical and scientific organizations, societies, laboratories, and journals. Communications on this subject should be addressed to the Surgeon General, United States Navy, Washington, D. C.

II

TABLE OF CONTENTS.

	Page.
PREFACE	V
NOTICE TO SERVICE CONTRIBUTORS	VI
SPECIAL ARTICLES :	
COLOR BLINDNESS.	
By Captain E. J. Grow, Medical Corps, U. S. N.....	717
CARDIAC IRREGULARITY.	
By Commander E. U. Reed, Medical Corps, U. S. N.....	732
HANDLING OF RECRUITS, MARINE BARRACKS, PARRIS ISLAND.	
By Lieutenant Commander J. C. Parham, Medical Corps, U. S. N..	740
FOUR CENTURIES IN THE TREATMENT OF SYPHILIS.	
By Lieutenant L. W. Shaffer, Medical Corps, U. S. N.....	749
A MARINE CORPS FIELD HOSPITAL.	
By Lieutenant Commander G. F. Cottle, Medical Corps, U. S. N..	762
TRAINING AND CARE OF THE FOOTBALL SQUAD, U. S. NAVAL ACADEMY, ANNAPOLIS, MD.	
By Lieutenant M. H. Roberts, Medical Corps, U. S. N. R. F.....	770
GAS POISONING IN WARFARE.	
By Lieutenant G. H. Mankin, Medical Corps, U. S. N.....	775
VENEREAL PROPHYLAXIS AMONG U. S. MARINES AT HONOLULU.	
By Lieutenant Commander H. H. Lane, Medical Corps, U. S. N..	783
HISTORICAL :	
THE MANILA GALLEON.	
By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N..	787
EDITORIAL :	
ON LEARNING TO WRITE—ON SEVERAL PHASES OF SYPHILIS	801
SUGGESTED DEVICES :	
DENTAL X-RAY FILM HOLDER.	
By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N..	807
SUGGESTION FOR RECORDING DENTAL CONDITIONS.	
By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N..	807
CLINICAL NOTES :	
A CASE OF CUTANEOUS SPOROTRICHOSIS.	
By Commander R. E. Hoyt, Medical Corps, U. S. N.....	809
REPORT OF PELLAGRA IN HAITI.	
By Lieutenant Commander G. F. Clark, Medical Corps, U. S. N..	813
ACUTE RHEUMATIC FEVER.	
By Lieutenant W. M. Alberty, Medical Corps, U. S. N.....	814
A CASE OF POISONING BY OIL OF CHENOPODIUM.	
By Lieutenant B. F. Norwood, Medical Corps, U. S. N.....	818
BRUSHING THE TEETH.	
By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N..	824
TWENTY-EIGHT CASES OF PNEUMONIA.	
By Lieutenant J. R. Jeffrey, Medical Corps, U. S. N.....	825
A CASE OF TUBERCULOUS MENINGITIS.	
By Lieutenant Commander S. P. Taylor, Medical Corps, U. S. N..	830
CHOLECYSTECTOMY AND PYELOTOMY IN GUAM.	
By Commander A. H. Robnett, Medical Corps, U. S. N.....	831

CLINICAL NOTES—Continued.

ELEPHANTIASIS OF THE SCROTUM.

By Lieutenant L. W. Breene, Medical Corps, U. S. N., and W. Zur Linden, chief pharmacist, Medical Corps, U. S. N.....	Page 834
---	-------------

RULES FOR MASSAGE.

By Commander W. S. Bainbridge, Medical Corps, U. S. N. R. F....	835
---	-----

PROGRESS IN MEDICAL SCIENCES:

GENERAL MEDICINE.—Transfusion of blood—Diabetes mellitus in the Negro race—Diagnosis of syphilis in malarial subjects—So-called diseases of the blood—Singultus—The rôle of the prostate and seminal vesicles in arthritis—Medical aspects of naval aviation—Treating syphilitics—The etiology of scurvy—Food accessory factors in relation to the teeth.....	839
---	-----

SURGERY.—Immediate surgery in fighting ships—Immediate surgery of war wounds as practiced in hospital ships—The surgical treatment of empyema by a closed method—Willems treatment of knee-joint injuries—Observations on primary venereal sores—Resection of the small intestine for war wounds—Tetanus in the British Army during the European War.....	855
---	-----

TROPICAL MEDICINE.—New method of treatment of trypanosomiasis—Differential diagnosis in tropical fevers—Schistosomiasis in the Yangtse Valley—Carriers of dysenteriae among soldiers—Liverpool School of Tropical Medicine.....	870
---	-----

PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY.—Cultivation of gonococcus—Aestivo-autumnal malaria plasmodia—Virulence of diphtheria-like organisms.....	885
--	-----

CHEMISTRY AND PHARMACY.—Absorption of calcium salts in man—Improvements in the Nephelometer-Colorimeter—Substitution of turbidimetry for nephelometry in certain biochemical methods of analysis—Creatinuria—Phosphoric acid in the blood of normal infants—Basal metabolism of normal women—Fat-soluble vitamin—Standards for normal basal metabolism.....	887
---	-----

EYE, EAR, NOSE, AND THROAT.—Injuries to the ear in modern warfare—Injuries to the ear in modern warfare—Symptomatology and diagnosis of foreign bodies in the air and food passages—Etiology and prevention of injuries to the eye—Mosher-Totl operation on the lachrymal sac—Tuberculosis of the middle ear.....	892
---	-----

NOTES AND COMMENTS:

Colles's Fracture—The French view of an American medical congress—Case Records of the Massachusetts General Hospital—National cancer week—Pharmacopœia of China—Municipal disposal of garbage—American Journal of Tropical Medicine—Danger of week-end camping in the Tropics—Influenza epidemic in the British Navy—Benvenuto Cellini—A Consulting Surgeon in the Near East—Asphyxiation in Garages—Dental service in the British Navy—Surgeon Captain Lomas, R. N.—Counsels and Ideals from the Writings of William Osler—John Keats, apothecary and poet—Life and times of Ambroise Paré—Treatment of ozena—Lead poisoning in the pottery trade—The International Journal of Gastro-Enterology—Treatment of malarial fever—Formaldehyde poisoning—Toxic effects of shaking arsphenamine solution—Peking Union Medical College—Milk standards.....	901
--	-----

BOOK NOTICES.....	921
-------------------	-----

INDEX.....	933
------------	-----

PREFACE.

The UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,

Surgeon General United States Navy.

▼

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XV.

OCTOBER, 1921.

No. 4.

SPECIAL ARTICLES.

REMARKS ON COLOR BLINDNESS, TOGETHER WITH SOME OF THE OBJECTIONS FOUND WITH A FEW OF THE COLOR PERCEPTION TESTS NOW IN USE.

By E. J. Grow, Captain, Medical Corps, United States Navy.

Contrary to the generally accepted idea, color blindness is found both as an acquired and congenital affection. The former accompanies certain diseases of the retina and optic nerve, and is much more frequent than is supposed; the latter is not exactly a disease, but a condition depending upon causes that have thus far baffled science to discover.

Congenital color blindness may present a total inability to distinguish any color whatever, a condition very rarely found, or it may show a defect in color perception so slight as to be discovered only with difficulty, this latter being very common. Between these two extremes an infinite number of degrees of partial color blindness are found; in fact, it is difficult to find two color-blind persons with exactly the same amount and degree of color defect. It is also rather unusual to find a person who is completely color blind to one color without at the same time being more or less deficient in the perception of at least one other color.

It is generally supposed that in total color blindness all colors have a gray appearance and that the loss of perception for any one color results in a gray hue for that color. This may be true provided no other wave lengths are reflected from or transmitted through the color object observed, but as this is generally the case, no one knows with certainty exactly how colors are perceived by the color blind. A person who is red blind sees a dark-red object as nearly black while a light well-saturated red excites in him a visual sensation not unlike that received from a light green. In this way a red-blind individual is often confusing certain shades of red and green but not all shades. The shade of green which is most often confused with red by red-blind people is a blue green, the complementary color of red, and not a pure arsenite or copper green. In connection with this fact, it will be remembered that the green running lights on most of our boats in the Navy have a distinct bluish cast. The above

would make it appear that blue would not be a useful color adjunct in the glass used for running lights as it would tend to increase the chance of confusion, but this confusion is not so readily found in transmitted light as in reflected light.

Partially color-blind people have the sense of detecting differences in luminosity highly trained. This assists materially in avoiding color mistakes. Take a red-blind individual and place before him a bright red and a bright green object of such shades that they appear to him to be the same as far as color is concerned, and in addition arrange it so that the luminosity of each object appears the same to the normal eye, then in spite of this similarity he will, after a little practice, instantly tell which is red and which is green by the difference in luminosity alone, because the relative luminosity of objects as seen by the color blind is so different from that seen by the normal individual. In this case the red object excites very little retinal stimulation in the red blind and looks very dark, perhaps nearly black or of a very dark brownish shade, while the green object excites full retinal value and is seen in its full luminosity, and the difference in luminosities is therefore marked even though it appears practically the same to the normal eye. This rather curious fact is often overlooked in tests for color blindness and explains how some partially or completely color-blind individuals have comparatively little difficulty in distinguishing certain shades of red from green if the luminosity of both test objects is high, but reduce the luminosity especially that of the green object to a point so low that it looks like a red object to the color blind, and then he is robbed of the aid that luminosity gives and is compelled to rely on color sense alone, with the result that a confusion of colors is experienced and the color defect is demonstrated.

What is true in regard to those affected with red blindness is also true in a little less degree of the green blind so that in any test for detecting color blindness measures should be devised that will take away, as far as possible, the color blind's greatest aid, luminosity. This fact was taken into consideration in designing an improved color test, a description of which will appear in a future article.

As to acquired color blindness, it is always met with in cases of optic atrophy. In fact, this disease furnishes one of the most frequent causes of disturbed color perception. Here we may expect a loss of visual acuity along with a gradual lessening of the color vision. In this class of cases the loss of the central perception for green is first noticed, followed closely by that for red, and by the time these are gone the loss of perception for yellow and finally for blue is experienced. In some cases of poisoning by chemicals, also not infrequently with persons who use alcohol and tobacco with

excess, we find a small central scotoma for colors. If from these latter causes, the loss of color perception is often restored provided the case is properly treated. Almost invariably in acquired color blindness the form vision is also faulty, which gives us a possible aid in diagnosing the acquired from the congenital type. Occasionally a marked diminution of color perception is experienced for several months, only to clear up finally and leave no traces behind, all apparently without cause. This is an exception, however. As to the pathology of such cases, it is difficult to say. The writer well remembers the case of a young naval officer who noticed that he could not see the red and green lights at night nearly as far away as he was accustomed, but if he came close to the colored lights he could see them perfectly as far as he could judge. There seemed to be nothing to account for this condition and the form vision was not interfered with. After this had lasted for six months he found that he could see colored lights farther and farther away and finally the normal condition was fully restored. This officer had been subjected to the bright sunlight on the water for some weeks prior to this curious phenomenon and this may, in some way not fully understood, have caused the color defect. All this goes to show that acquired color blindness must always be kept in mind when patients are affected with a lack of color perception in any degree whatever.

To demonstrate with accuracy the existence of a color defect in some individuals requires careful and painstaking effort. Not only must the tests employed be such as to assure confidence in the results, but the examiner must be well trained in this line of work to enable him to exercise sound judgment in interpreting the results obtained from the various tests employed.

Color blindness causes no great hardship on any person unless he wishes to take up some calling in which accurate determination of colors is a requisite, such as an employee on a railroad or on a sea-going vessel. Here it must be borne in mind that one must be on the alert for all sorts of tricks and schemes to deceive the examiner, especially by those who know in advance that they have a color defect which might be sufficient to deprive them of obtaining a life-long occupation. This is noticeably true of applicants for the Naval Service. One of the most frequent methods of surreptitiously passing the color examination is to obtain the test used in advance, then to practice with it until, by the aid of relative luminosities and in other ways, the applicant often is able to slip by a somewhat inattentive examiner. That a color-blind person may enhance his chance of eluding the examiner in this way is true beyond any argument, and it is remarkable what improvement may be obtained by only a brief acquaintance with most of the tests in general use. In devising the improved color test mentioned above this fact has been con-

sidered and a scheme worked out by which the applicant under examination can gain a minimum of advantage even though he has possession of the test and should practice with it long and continuously prior to examination.

The custom of requiring the applicant to name the colors in whatever test he is being examined has evoked a great deal of discussion pro and con. After weighing the arguments presented by both sides the consensus of opinion is that not only is it not necessary to give color names, but it is inadvisable, as the color blind have ways of giving the names correctly though they may not see the color as a normal eye should. An uneducated person will often have either no correct knowledge of the names of the colors, or he will, in his enthusiasm, give more or less fanciful color names that will leave the examiner in the dark as to whether the colors are really seen in their true value or not. The ideal arrangement would be to have a test so simple that it would permit of the application of a rule that the less talking there is on both sides during the examination the more accurate will be the results.

The tests used for detecting color blindness are many. All are probably of use, but some are of decidedly more value than others. No test has ever been devised which satisfies all the objections that can be raised against it. The efficiency of any one test depends in a great measure upon the skill, judgment, and common sense of the examiner.

Two tests much used and well thought of on the Continent, but seldom seen in this country, are the pseudo isochromatic diagrams of Stilling and the cards of Nagel. The former consists of squares of selected colors, so arranged that they form different letters or figures, and the colors are chosen with reference to confusions which are well known to bother ordinary color-blind persons. To this class the squares all look alike, and they are unable to see the letters which are formed by them, thereby demonstrating the lack of color perception. This test would be of far more value if all color-blind individuals presented the same degree of defect, but as this varies greatly this test fails to detect many. The latter test consists of 12 cards on which are presented a number of colored disks arranged in circles. The disks on some cards are all of the same color, but of slightly different shades, while on other cards the usual confusion colors are presented. By requiring the person being examined to select all the disks of the same color, the absence or presence of color blindness is determined. This test is a delicate one and requires not only keen color perception but an active mentality as well in order to give anything like satisfactory results. Both of these tests have many objections, by no means the least of which is that an intelligent color-blind individual can gain a tremendous advantage if he has the

privilege of studying and practicing with them before examination. How advocates of these tests can gain anything like satisfactory results when under the stress of examining a large number of men in a limited time, as is often required, is a mystery. Certainly, for our use in the United States Navy, they would be only of problematical value as a confirmatory test in a few doubtful cases, and only then when the time and patience of the examiner could be utilized ad libitum.

Most of the color tests in general use are mainly qualitative in nature, though a certain amount of quantitative information can be deducted from some of them. A few tests, as that of Wolffberg and Weber, are wholly quantitative. They are based on the principle that a colored object of a definite area can be seen at a certain maximum distance. If the object is of such size that its color can normally be correctly made out at 20 feet and no further, by a person with average color perception, a 20/20 color vision basis is established; the denominator of the fraction indicating the maximum distance at which the color is to be seen normally and the numerator the distance at which it is actually seen. Thus, if the applicant can not state the color correctly unless he walks up to within 3 feet of the test object, he would be recorded as having 3/20 perception for that particular color; a scheme of examination not unlike the one now used in the United States Navy to determine quantitatively the form vision. From a practical standpoint the above-mentioned tests are more or less unreliable, as slightly varying conditions of the illumination, together with the frequent differences in brilliancy of the test color, tremendously alter the results of the examination. Even if the examiner had his own test completely standardized under operating conditions, the knowledge thereby gained would be of little value because what we wish to know, in the military service, is not so much the accurate determination of the quantitative color perception in any case as we do the qualitative perception. Has the applicant under examination normal color vision or not? This is the question we ask ourselves. If not, he would be a menace if placed in responsible positions on shipboard where judgment and action depended in any way upon the correct interpretation of either colored lights at night or colored flags in the day time; in other words, he should be rejected for such occupation if his color vision is below normal.

This brings up the question, What is normal color vision? Both scientific experiment and practical experience teaches us that the realm of normal color vision covers considerable latitude. The minimum might be represented by a person who perhaps has never been taught the names of colors nor has had occasion in his daily work to observe colors or give such matters any thought, but when placed before reliable tests gives evidence of seeing the primary colors suffi-

ciently accurately to safely warrant his employment in responsible positions where correct determination of colors is necessary. The other extreme of normal vision might well be represented by the person who can actually see violet as a distinct color in the spectrum. It is claimed that not one person in five thousand has sufficiently acute color perception to enable them to do this. Between these two extremes lie many different degrees of proficiency, all of which could properly be considered as coming within the realm of normal color perception. Women in general appear to average higher than men in this matter. Whether their better color perception is because women as a rule use colored materials more than men, or whether it is due to some hereditary influence, science has not enlightened us, but the fact remains. Artists who have used colors for a considerable time become highly proficient and can see shades and tints that are denied to many not so trained. That the delicacy of color perception can be improved by study and practice is true, as the writer well knows, for he can now see red in certain dark purple pigments which formerly were considered as simply blue or indigo.

In testing applicants for the United States Naval Service for color blindness we are not so much concerned with the upper as we are with the lower register of normal color perception. In order to satisfy this requirement we should introduce a quantitative element which might be considered the only quantitative determination necessary in our tests, namely, the establishment of a point or threshold below which it is not safe to accept men for the service. There is no dividing line to mark the transition from normal to defective color sense. All tests leave a wide margin in this respect, and a wider margin is left to the whims and fancies of the various examiners who arbitrarily settle this point as their conscience seems to dictate at the moment. How often have we seen a candidate rejected by one examiner only to be accepted by another and both examiners using similar tests. How often have we seen several examiners constituting a board acting as a sort of a court of appeal, repeatedly examining candidates and finally being considerably in doubt as to whether they were color blind or not. This is explained by the fact that such candidates represent border line cases in the transition from the normal to the abnormal in color perception, and when our tests are most needed to decide these cases they fail and leave us stranded, the decision reverting to the examiner who is as likely to be wrong as right. As far as color perception is concerned, a man's acceptance or rejection in the service often depends upon what kind of an examiner he comes before. This should not be so. We should have a test that would give us a minimum of normal color vision below which no one should pass and above which we are perfectly safe to

accept. This important point has been considered in a new proposed color test, a description of which will be given at a future time.

A color test which has been used by examiners everywhere and which has for a long time been the official test in the United States Navy is that of Holmgren. More or less recently the leading nations have been gradually discarding this test and substituting others, because it is claimed that the Holmgren test can no longer be considered reliable and that color-blind persons often easily pass the test and that, just as likely as not, many who are not color blind will be rejected by it. Even in the United States most of the railroad companies which formerly relied on this time-honored test now regard it with suspicion and are adopting other and perhaps better means of detecting color blindness.

Therefore it becomes pertinent as to whether we should not carefully consider the advisability of changing the color-perception test now in use in the United States Navy, especially if the Holmgren test is as unreliable as many claim that it is. This question could be more readily answered if something better had already met with universal approval and had generally been recommended by scientists and others who had given much study and thought to this particular field of endeavor. Unfortunately no such agreement has ever been reached, but, on the contrary, a most marked disagreement exists. Not only are scientists all over the world at loggerheads over the physiology of color perception, but they are even more at variance when it comes to agreeing upon an adequate and practical method of detecting defective color perception in any given individual. A description of the method of operating the Holmgren test is unnecessary, as it is generally so well known. Therefore we can proceed at once to consider some of the objections that are raised against it.

In the first place, the colored yarns that comprise the test easily fade. Especially is this noticeable as regards the lighter shades, on which the value of the tests in a great measure depends. This is unquestionably a serious defect and unless a fresh supply of yarns are constantly kept on hand, to replace those that have deteriorated, results obtained by this test might at times be reasonably questioned. Often we have seen the light green and the light rose (purple) skeins so faded that the original color was in doubt. Under these conditions it could hardly be expected but that the results of the test would be confusing and this is exactly what happens not infrequently.

In describing his own test, Holmgren states that the dark shades of the colors could have been used equally satisfactorily for the test skeins, but for reasons given he sees fit to use the light green and light rose (purple). Had all dark shades of the test colors

been employed, the objection relative to the fading of the yarns would have been largely eliminated.

Another objection to the Holmgren test is that the skeins are so large that cases of central color scotoma are not detected. This is quite true. The London Board of Trade considered it to be of sufficient importance to warrant the necessity of using an associated lantern test by which small areas of colored light could be obtained and viewed from a distance and as these colored areas would be subtended by the macular region only, any possible error from this source would be eliminated. The writer does not consider this as serious an objection to the test as some would lead us to believe, especially in the United States Navy, where high visual requirements are demanded. Associated with central color scotoma there is always a considerable loss of central acuity for form vision and the applicant would be rejected for lack of ordinary visual acuity before the central color defect, even if present, would be a factor. It is doubtful whether the additional use of a lantern test would be of much aid in eliminating these cases, for the person examined, even if he had a central color defect, would look at the colored lights in the lantern a little eccentrically and frequently be able to name the colors correctly by utilizing his peripheral color perception. The writer once had a candidate under examination who had a small absolute central scotoma which included a defect both for form and color. He could not make out any of the letters at 20 feet on Snellen's card, except the largest letter which he figured out after a while by looking at it obliquely, but he was able to name the colors in a test lantern at 20 feet correctly. When asked how he did it he stated that he looked at the edge of the colored light and then he could make out the color, but if he looked directly at it he could not make it out. In this case he utilized his peripheral color vision to the fullest extent. When a man is in danger of losing a coveted position because of defective color sense it must be expected that he will use all his faculties to enable him to cover up the defect, and the examiner must be on his guard and not rely too much on any color test but to examine carefully into the form vision as well when central or macular color defect is in question.

An important objection to the Holmgren test is that, owing to the large variety of colors among the yarns presented for examination and the unfamiliarity with the procedure required, the candidate is often confused. This state of confusion is frequently found, and the examiner should be alert to notice it and take time to carefully instruct the candidate so that no misunderstanding will occur. It must be generally admitted that any test which leaves the candidate in doubt as to exactly what is wanted of him in order to carry out the test will operate to introduce an uncertainty as to results and will

work to a disadvantage to that extent. When the first skein of yarn that is generally given, one of a pale pure green, is presented to the candidate, and before he fully realizes that it is expected that he will select only those of pure green, he is very likely to select some of the yellow greens and possibly an occasional blue green as well, not because he does not see the pure green properly, but because he sees the green in other skeins and, in his enthusiasm to perform the test well, he includes all skeins that have green in them. Some examiners will reject candidates if they include any yellow greens in their selections, when in reality these are not confusion colors, and the fact that they are included not only does not indicate that the individuals are color defective, but rather tends to show the reverse. It might be properly said that such rejections should not be made and that the examiner would be at fault if they did occur. It all goes to show how the candidate may only with difficulty understand what is wanted of him when examined by Holmgren's method, and therefore constitutes a valid objection to the test. Occasionally the candidate will be confused when the rose (purple) test is given out, and the examiner must fully satisfy himself that this part of the test is well understood or he will in a hasty examination conclude that a defect exists when it does not.

The red skein affords little chance for misunderstanding. The greatest chances for confusion are among those candidates who are mentally rather dull and to whom explanations mean little unless they are driven home slowly and in a painstaking way. When one considers the various conditions that exist in a busy recruiting office, together with the carelessness of some examiners and the class of candidates that often come up for examination, it is hardly to be wondered at that the Holmgren test should be a confusing proposition to many. The test to be sought for is one that is so simple and plain that anyone can comprehend it instantly and thereby eliminate all chance of dealing with a confused candidate. The proposed new color-perception test well satisfies this requirement.

That the Holmgren test does not detect those cases of color blindness resulting from a shortening of the red end of the spectrum may well be considered an additional and important objection. Strange as it may seem, quite a percentage of people can not make out the color at the extremes of the spectrum as they should, although the intervening colors are all seen normally. This defect is more frequently noticed at the red rather than at the violet end of the spectrum. It is unfortunate that this should be so, for red is universally adopted as a danger signal and it is important that every one should have the ability to discern this color throughout its entire range; that is to say, a range such as is applicable to the so-called normal eye.

It being the very limit of the visual red end of the spectrum that is deficient to a greater or less extent in these cases we find as a result that it is the darkest shades of red that particularly cause trouble. These shades can not be distinguished from dark browns or dark greens, whereas the bright reds which appear further up on the spectrum are correctly seen. This fact may, in a measure, account for the almost total lack of rejections made when using the bright-red test skein in the Holmgren test, although by the rose (purple) test a defect in the red is often at the same time detected.

If a red flag is removed far enough away from the observer it can not be told from a brown, green, or black flag even by the normal eye, and it is well known that a red light under the most favorable conditions can not be made out beyond a certain distance. Under unfavorable atmospheric conditions, as in a smoke or fog, a red flag or a red light will look darker than usual, and it will require a keen perception of this color, which then becomes not unlike that found at the extreme red end of the color spectrum, in order to make it out without error. If, at the same time, the individual has a shortened perception for the red end of the spectrum he will be all the less able to discern the red color; that is to say, he will be correspondingly less able to do it than the normal individual should. In detecting these cases the Holmgren test fails; but if the examiner would augment the test as officially described by selecting several dark browns, dark greens, and dark-red skeins, and then ask the candidate to differentiate them, this objection would in a great measure be eliminated, and in this way those defective at the extreme red end of the spectrum would be detected. Unfortunately the Holmgren test yarns have very few real dark-red skeins which can be utilized for this supplementary test and hardly a sufficient number of the dark browns or dark greens to satisfactorily eliminate cases of shortened dark-red perception. The candidate who is defective only in the dark-red end of the spectrum would, in all probability, pass the Holmgren test with ease, and when placed in a responsible position at sea would be at a disadvantage compared with one not so afflicted. A test which will eliminate this chance of error is desired.

Severe criticism of the Holmgren test has been made in that it allows a moderately color-blind individual an excellent opportunity to conceal his defect by comparing the relative luminosities of the test skeins. As previously mentioned in this article, this is an important matter and constitutes a valid objection not alone to this test but to many others. Applicants who are aware that they have a slight color defect frequently procure the test yarns and practice with them and when aided by a keen sense of the relative luminosities of the colors can pass with surprising accuracy. This is especially evident when the test has been hastily conducted. If the examiner

will take plenty of time and supplant the usual routine with groups of shades of his own selection, having in mind that it is much more difficult to select colors correctly if the group of yarns from which the selection is to be made are all of about the same luminosity, he may sooner or later catch the applicant off his guard and a marked color defect be demonstrated. In these difficult cases it would be of aid if the examiner had access to several sets of Holmgren's tests which could be combined, thereby giving a far greater assortment of just the shades and luminosities desired. Few examiners have the time and patience to carry the examination thus far. When a slight defect in color perception is finally demonstrated, we are not always certain whether it is sufficient to cause rejection or not; then we are face to face with another objection to the Holmgren test in that it gives us neither a quantitative standard nor a guide by which we can tell whether the candidate is below the minimum normal requirement or not. The decision in this matter is left to the judgment of the examiner, and, as previously stated, this judgment varies considerably.

It seems in these border-line cases that opinions of various examiners so differ that it operates to make the candidate's chances of passing the test somewhat of a gamble. A record can be made that the candidate has feeble chromatic sense, but there is nothing to guide us as to whether it is sufficient to cause rejection or not except the opinion of the examiner. The writer well remembers the case of a midshipman at the United States Naval Academy who was passed by the Board of Medical Examiners as being free from color defect. After a few weeks this midshipman was rejected by the same board as being color defective, and then again later on was passed by the same board as having satisfactory color perception. This was simply one of those border-line cases on which the Holmgren test gave no information as to whether the candidate was defective to a degree which should cause rejection or not, and the opinion of the board of examiners simply varied from time to time. There is nothing strange about this; in fact, it more strange that it does not occur more often. If we had a test for our own use in the United States Navy which gave us a definite color defect limit below which it would be unsafe to accept a candidate, it would fill a long-felt want.

The London Board of Trade raised the objection that the Holmgren test was too elaborate to be carried out by a person with little or no knowledge of color vision. Most of the medical officers of the United States Navy have received special instruction in the use of this test which, together with considerable experience in its application, should qualify them as experts so that the objection suggested

above would not so readily apply in their case. Occasionally we find the test applied in a careless manner, and not infrequently the classical routine is varied considerably by different examiners. Too much latitude is unwise, as the best results are obtained only if the original directions of Holmgren are closely followed.

That too much time is consumed in applying the Holmgren test is often raised as another objection. This depends somewhat upon how much time the examiner has at his disposal. If there are a large number of men to be examined in a limited time, a condition is often found, as in a busy recruiting office, where the above objection assumes importance, and in all doubtful cases it does take time to properly conduct this test; perhaps more than a test of this kind should. A shorter method, if efficient, would be welcome to medical examiners and it is believed that this will soon be available.

Before leaving the discussion of the objections to the Holmgren test the writer wishes to state that he is of the opinion that there is much that is good that can be said of it and that, although many valid criticisms can be made, it still stands as a valuable test and is preferable to some that have been devised to take its place. A test that has been used as a standard in the United States Navy for 40 years, more or less, and with not a serious accident occurring at sea in our Navy during that time which could be attributed to defective color perception as a result of any defect in this test, certainly deserves consideration.

A test based upon Holmgren's theory and like it in having colored yarns to be selected, but differing from it in the method of its application, is that of Jennings. This test has received favorable comment from various sources. However, its value to examiners in the United States Naval Service is somewhat doubtful. In brief, it consists of two shallow square pasteboard boxes with their bottoms joined together but each box having a cover. One box contains a card on which at intervals numerous small colored yarns are fastened, all of which are greens of various shades or of confusion colors likely to be mistaken by the green blind. On another card placed in the second box the yarns are similarly arranged, but consist only of rose colors or other shades easily mistaken by the red blind. Near each colored yarn is a hole through which the individual under examination inserts a stylus which punches a record sheet placed on the reverse side of each card, thus indicating and recording for future reference the color selected. The whole plan has been ingeniously devised and arranged. A more complete description can be found in the report of the section for ophthalmology of the American Medical Association for 1914. As this test has already been distributed to many medical officers in the United States Navy it might be well to consider certain facts connected with it.

One advantage that the Jennings test has over that of Holmgren is that the colors are not soiled in handling. Also the container is not so large and bulky and the yarns are much smaller, which latter may permit of more accurately designating the central color perception. The self-recording sheet may be an advantage or not, depending upon the point of view, with the argument somewhat in favor of the latter. If a naval medical examiner on the spot is unable to determine whether the candidate is really color blind or not, certainly no "court of review" which has only the record sheet as evidence on which to base an opinion is going to be able to come to any more accurate decision. If the record sheets are to be passed upon elsewhere than at the place of examination, much loss of time, perplexity, and mistakes are sure to follow. Serious confusion will result unless the test-record sheet is placed in each box exactly as directed, and any carelessness in attending to this detail introduces an excellent chance for error. As there are four different ways in which each record sheet can be placed in each box, only one way being correct, it can be seen that not infrequently many sheets are likely to be wrongly inserted, thereby rendering the result of this examination of little value. This test also fails to detect those color defectives who have a shortening of the red end of the spectrum; in fact, it is not even as suitable as Holmgren's test for this purpose. The examiner has no opportunity to group together the darker shades of red, green, and brown in order to demonstrate whether the applicant is defective for dark reds or not, because the colored yarns are fixed on the cards and can not be removed. These yarns are about as likely to fade as those of Holmgren and this, we have already seen, is a serious factor in any test and one of the drawbacks to be considered. The relative luminosity of the test yarns in Jennings's test can be taken advantage of exactly as well as in the Holmgren test, a discussion of which has previously been considered. To us in the Naval Service the most serious defect of Jennings's test is that any bright moderately color-blind individual will, after a little study and practice with the test, be able to make his selections by memory. Any scheme where the test yarns are in a fixed position readily lends itself to memorization. This objection alone renders the test practically valueless to the naval medical examiner. The writer has also serious doubts concerning the practicability of Jennings's test. This was demonstrated in the following manner:

One hundred persons, representing 20 officers and 80 enlisted men in the United States Navy, all of whom were previously shown to be free from color defect at least to any degree which would be disqualifying for a seafaring life, were each put through the test. The result showed that 31 enlisted men and 9 officers made from one to five mistakes each, and according to the test every one of these indi-

viduals would have been a case for rejection. From this it would appear that with Jennings's test we would be in great danger of rejecting a large number of men who had sufficiently normal color perception for all practical purposes. If we were to allow each candidate one mistake for good measure, even then we would have rejected several who were not color blind. When these same officers who had made mistakes were shown their errors they then all easily passed the test correctly, and only 5 of the 31 enlisted men made mistakes after being instructed concerning their previous errors, and 4 of these were credited with only one error. Some of those who performed the test in a rather careless manner seemed to fare better than those who were more deliberate and observed each color carefully before making a selection. There are one or two shades that are most confusing to any person, especially if they have not received instruction concerning these particular shades beforehand. The writer considers Jennings's inferior to Holmgren's for Navy purposes simply because the results of the former are so confusing and so unsatisfactory, especially when memory has any opportunity to play a part, that the examiner is left very much in doubt as to who to accept or who to reject.

There are several lanterns on the market for detecting color blindness, each so devised that various colored lights are shown and the candidate under examination being required to name the colors as they are presented. It has been claimed that because a person could not match colored yarns correctly it was no criterion that he could not correctly discern colored lights in their true value. That a test with colored lights is of value in detecting color blindness is true beyond question, but too great reliance must not be placed upon such tests to the exclusion of all others. It must be remembered that at sea a sailor is often required to correctly see various colors in flags during the day as well as colored lights at night. This fact is often overlooked by zealous devotees of the lantern test.

The efficacy of all lantern tests rests on the ability of the candidate to correctly name the colors. This brings up again the objections regarding color names. Many of the candidates will look at the colored light for some time before giving a name. This takes up valuable time of the examiner, and even then the latter is never certain that the color name given really tallies with the color as seen by the eye under examination. The writer well remembers the case of a midshipman who was reported as being slightly color defective, as was shown by a careful application of the Holmgren test. To further test him out he was examined by the Edridge-Green lantern test when, to the surprise of everyone, he called all the colored lights shown by a wrong name, that is to say, he would call a red light green

and a green light red, a blue light purple, etc. This was confusing until it was found out that he was purposely miscalling the colors for, as he stated, he had figured it out that if all this fuss was made over his color vision he must be color blind, and if he reversed the color names he would probably hit them right and thus be able to pass the examination. It was later found out that his vision for colored lights was quite accurate.

Of the various lantern tests available, that of Edridge-Green, mentioned above, is unexcelled by any. The writer has used this lantern test for 12 or 13 years and considers it of special value as a confirmatory test in difficult cases. To give a full description of this test and its proper application would require more space than can be afforded in an article of the kind. In brief, the Edridge-Green lantern has several slides, some holding colored glass disks, others holding modifying glasses by which the appearance of the transmitted colored light may be made to simulate that seen in a fog or rain. Only one color is presented to the candidate at a time, therefore the candidate has no opportunity to compare it with other known colors. The lantern is electrically illuminated and well constructed. In order to obtain satisfactory results with this lantern, the examiner must devote considerable time to the study of the principles involved and learn the value of the various combinations of colored glasses that are used. It is a much more difficult test to understand than Holmgren's, and likewise presents far greater chances for error in results. It is not a test for the novice. If reasonable common sense is not exercised and the directions are not followed, the test can easily be pushed to a point where practically everyone would fail. On the other hand, it admirably lends itself to certain refinements of color testing not found in any other lantern test; for example, colored rays can be absorbed by throwing in certain combinations of colored glasses which would alter the color as observed by the color blind but which would remain the same to the normal eye. A considerable variety of modification of colors can be made by this test which would more clearly show up the color defects in various varieties of color-blind individuals.

For use in the United States Naval Service a lantern as complex as that of Edridge-Green would only be practicable on stations ashore, and even then only in the hands of trained examiners. In localities where electricity is not available it could not be used. Should the lantern be dropped and the colored glasses be broken, they could not be replaced probably without sending to London. It is also more expensive than some of the simpler tests, and in the hands of the average examiner it is doubtful whether as accurate results would be obtained as are now acquired by the use of Holm-

gren's test. Edridge-Green has given us a yarn test, also a bead test, for detecting central color defects; the latter is most excellent, and anyone who satisfactorily completes this test certainly has no color disturbance at the fovea.

CARDIAC IRREGULARITY.

By E. U. REED, Commander, Medical Corps, United States Navy.

Irregular heart action is frequently encountered and some forms indicate serious conditions of the heart while others have no serious prognostic importance. Only in recent years have we been able to clearly differentiate between the different forms of irregularity and our present knowledge has resulted chiefly from use of the polygraph and electrocardiograph.

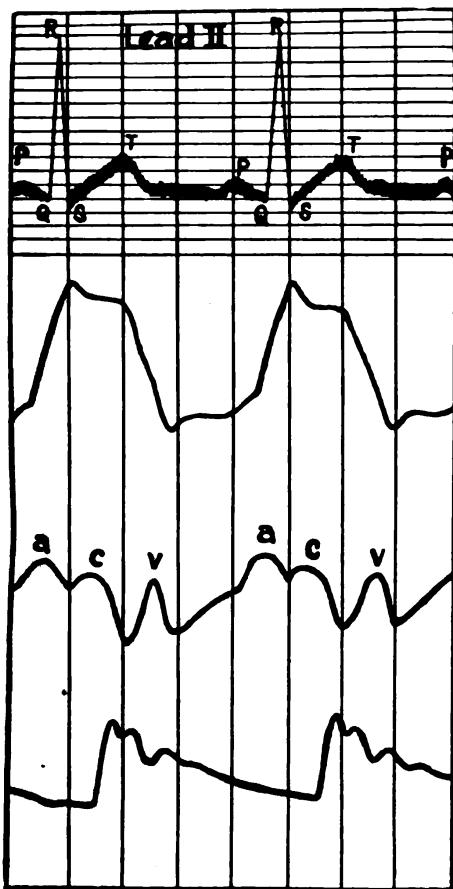
A satisfactory diagnosis can usually be made with no other instrumental aid than that of a stethoscope, if the examiner has a clear understanding of the mechanism of each of the forms of irregularity. In order to acquire this understanding a knowledge of polygrams and electrocardiograms is of the greatest value. After a few essential statements concerning the normal cardiac mechanism and the normal graphic tracings, a synopsis of the differentiation of irregularities will be presented as it has been found most useful at the Naval Medical School.

The normal cardiac excitation wave starts at the sino-auricular node (pacemaker) at the junction of the superior vena cava and the auricle. This node is subject to inhibition through the vagus nerve and acceleration through the sympathetic nervous system. From the pacemaker this wave spreads through the auricular walls and very slightly precedes their muscular contraction. The wave is received at the auriculo-ventricular node, travels along the auriculo-ventricular bundle (bundle of His), in the interauricular septum, and is released to the ventricles through the right and left bundle branches.

THE POLYGRAM.

The normal simultaneous polygraphic tracing from the apex (cardiogram), the jugular vein (phlebogram), and the radial artery (sphygmogram) shows the waves at these points resulting from cardiac systole. A time marker also records each fifth of a second.

The cardiogram may show a small "a" wave due to auricular contraction, but this is not usually recorded. The main upstroke marks the beginning of the ventricular systole and occurs one-tenth of a second before the "c" wave in the jugular tracing and one-fifth of a second before the primary wave in the radial tracing.



NORMAL GRAPHIC TRACING OF THE
HEART

732

ELECTROCARDIOGRAM.

One-fifth second between vertical lines, which
represent simultaneous points of time.

CARDIOGRAM.

Apex tracing.

PHLEBOGRAM.

Combined jugular and carotid waves.

SPHYGMOGRAM.

Radial tracing.

The jugular tracing shows first an "a" wave, due to auricular contraction, then a "c" wave, due to the pulse in the underlying carotid artery and normally beginning within one-fifth of a second after the beginning of the "a" wave. Following the "c" wave is a "v" wave the summit of which is synchronous with the opening of the auriculo-ventricular valves, and nearly synchronous with the bottom of the aortic notch in the radial tracing.

The radial tracing shows a primary or percussion wave, beginning one-tenth of a second later than the beginning of the "c" wave in the jugular tracing, then a tidal or predicrotic wave ending in the dicrotic or aortic notch and finally a dicrotic wave.

THE ELECTROCARDIOGRAM.

The normal electrocardiogram records the excitation waves immediately preceding the muscular contractions. The vertical lines show twenty-fifths of a second, with heavier lines every fifth of a second. The first deflection in each cycle is the "P" deviation, due to the passage of the excitation wave through the auricles. Within one-fifth of a second after the beginning of the "P" wave the "Q. R. S." deviations begin, and they are followed by a slow blunt "T" deviation. These deviations are attributed to the spread of the excitation wave along the auriculo-ventricular bundle and branches and through both ventricles. The three leads give the waves produced in different axes of the heart. Lead I is obtained by connecting the right arm and the left arm with the apparatus, lead II by using the right arm and left leg, and lead III by using the left arm and left leg. "R-II" indicates the R deviation in lead II, "S-III" indicates the S deviation in lead III, etc.

For more detailed information and for illustrations concerning the above subjects as well as for the broader information suggested by its title, the book *Diseases of the Heart*, written by Sir James Mackenzie and published by the Oxford University Press, can be most highly recommended.

Practically all irregularities of the heart action come under the following headings: Sinus irregularity, extra-systole heart block, auricular fibrillation, pulsus alternans, auricular flutter, and paroxysmal tachycardia. Often a combination of two or more may be found in the same case.

SINUS IRREGULARITY.

This form is due to irregularity of the pacemaker and is attributed to reflex disturbances of rate through the vagus nerve. The changes in rapidity of the waves usually show close relationship to the

respiratory cycle, though other reflex causes may also affect them. It probably indicates alteration in vagus tone.

The polygram shows a normal sequence and time relationship of "a," "c," and "v" waves in each cycle, showing that the impulses originate in the pacemaker and traverse the normal paths. The irregularity occurs in the varying lengths of the diastoles.

The electrocardiogram similarly shows normal sequence and form of deviations with a normal interval between "P" and "Q. R. S." The intervals between the "T" and the following "P" deviations vary.

This form of irregularity is fairly common in young adults and may occur at all ages. It may be increased by deep breathing and tends to disappear when the heart rate is increased by exercise. It is usually abolished temporarily by a hypodermic injection of atropine. It is most frequently manifest as a rhythmic increase and decrease in rate with a definite relationship to the respiratory cycle and usually produces no subjective symptoms. Occasionally the pause between two beats may be so long that dizziness or syncope result. The interval between the first and second heart sounds does not vary, but the diastolic pauses vary appreciably in duration.

Sinus irregularity does not indicate any impairment of the heart. In fact, Sir James Mackenzie considers that its appearance after an acute infection is an indication that the heart has escaped damage. An unstable nervous system lends itself more readily to emotional and toxic reflexes and these may manifest themselves as sinus arrhythmia.

EXTRA SYSTOLE.

This form of irregularity is due to premature contractions originating outside of the pacemaker and indicating increased excitability of the myocardium. These premature contractions may originate in an auricle, in the auriculo-ventricular node or bundle, or in a ventricle, and, in the same case, extra systoles originating in different locations may be noted. The premature contractions are weak and each is followed by a prolonged (compensatory) pause as it has interfered with the next normal contraction from the pacemaker. Rarely the extra systole may be interposed between two normal contractions, but this is possible only when the pulse rate is quite slow. They may occur at regular intervals or only occasionally and are the commonest causes of intermittent pulse.

The radial tracing records each extra systole as a small and premature wave followed by a compensatory pause longer than the normal diastole. In the jugular tracing the corresponding "c" wave is also premature. A premature "a" wave may precede the premature "c" wave or be superimposed, producing a very large wave,

or follow the "c" wave, depending upon the location from which the extra systole started.

The electrocardiogram shows a premature "Q. R. S." complex for each extra systole with usually a disturbance in the time relationship between the "P" and "Q. R. S." deviations and followed by a compensatory pause. The premature deviations are often abnormal in form and direction and, by noting the variations in the different leads, the side from which ventricular extra systoles have started can be determined. Extra systoles are usually ventricular.

They can almost always be recognized by simultaneous palpation of the radial pulse and auscultation at the apex. A premature contraction abnormal in sound can be heard at the apex at the time of the small premature wave or intermission in the radial pulse. This will distinguish intermissions due to extra systoles from those due to heart block. Frequently a big jugular pulsation can be seen or felt at the time of the premature contraction. The extra systoles usually disappear when the heart rate is increased by exercise or otherwise and reappear after rest.

Extra systoles are most frequent in middle and advanced life and in men with some myocardial changes. They may occur at any age and, in the absence of other abnormality, they do not indicate an impaired heart. They suggest, however, some disturbance of cardiac nutrition due to toxic influences, structural changes, or overload. They may be present at intervals through a long and healthy life.

The individual may be conscious of the premature contraction, or the prolonged pause or the more vigorous contraction that often follows prolonged rest. In some cases anxiety, faintness, and even syncope may be produced.

HEART BLOCK.

This form of irregularity is due to interference with the transmission of the excitation waves. Such interference usually occurs in the auriculo-ventricular bundle or one of its branches. In first-degree block the transmission between the auricle and ventricle is delayed. In second-degree block some of the impulses fail to get through. In third-degree (complete) block none of the impulses get through and the auricles and ventricles beat independently.

In the first form the jugular tracing shows an "a"—"c" interval of more than one-fifth of a second and the electrocardiogram shows an increased interval between the "P" and "Q. R. S." complexes.

In the second form the jugular tracing shows regular "a" waves, some of which are not followed by "c" and "v" waves. Each "c" wave, however, is preceded by an "a" wave. The electrocardiogram shows similar absence of "Q. R. S." and "T" deviations after some of the "P" deviations.

In complete block the polygram shows regular "a" waves and usually regular, but less frequent, "c" waves. There is a complete dissociation between the two rhythms. Similarly the electrocardiogram shows regular "P" deviations, with no regular time relationship between them and the less frequent "Q. R. S." complexes. Ventricular extra systoles may intervene to disturb the otherwise regular rhythm of the ventricular complexes.

A right-branch block can be differentiated from a left-branch block in the electrocardiogram because of the variations in form of the "Q. R. S." complexes in the different leads. In both forms of branch block the "Q. R. S." complex, which normally occupies about one-tenth of a second, is increased in duration.

In partial heart block the pulse is usually irregular, and during the prolonged pauses no extra systole contractions can be detected. The intermissions due to extra systole are usually increased by deep breathing while those due to heart block are more often unaffected or diminished by it. Frequently a reduplication of the first or second heart sounds may be heard. Partial heart block is often lessened or abolished by exercise or administration of atropine and may be produced or increased by digitalis.

In complete heart block the ventricular rate is usually 20 to 36 per minute and the auricular rate about 72 per minute unless the auricles are in a condition of flutter or fibrillation. Complete heart block is almost always present if the ventricular rate is under 40, and should be suspected when the pulse is below 60 per minute. It is only slightly affected by exercise or atropine. The dissociation between auricular and ventricular rhythms may often be detected by simultaneous observation of the jugular vein pulsations and palpation of the radial pulse.

Heart block is usually encountered in young adults with a rheumatic history, in elderly persons with myocardial degeneration (often syphilitic), in patients suffering from acute infective diseases (partial block), or after large doses or prolonged administration of digitalis. Subjective symptoms usually result more from the associated organic changes than from the heart block itself. The ventricular slowness may produce symptoms due to cerebral anemia.

Heart block not due to digitalis indicates in practically all cases acute inflammatory or chronic sclerotic changes in the auriculo-ventricular conduction paths. These changes are almost always associated with well-marked similar changes in the myocardium and frequently with valve lesions. In an acute infective disease it may be the only sign of myocardial involvement. The prognosis depends upon the cause and the associated structural changes. Persistent heart block associated with syncopal attacks is a constant menace to life.

AURICULAR FLUTTER.

This form of irregularity is characterized by very rapid auricular contractions, 180 to 380 per minute. The ventricles can usually contract at so rapid a rate only temporarily and may respond to only part of the stimuli received, every alternate, third, or fourth impulse. This definite ratio between the auricular and ventricular contractions is usually characteristic, though the ventricles may occasionally respond at irregular instead of regular intervals.

The polygram shows a regular ratio between the "a" waves and the "c" waves and radial waves. The "c" waves are usually not manifest in the jugular tracing. The "a" waves are regular and usually occur at the rate of 3 to 6 per second. The ventricular rate may be the same or one-half, two-thirds, one-third, one-fourth, etc.

In the electrocardiogram the "P" deviations are regular, though very rapid. The "Q. R. S." complexes are less numerous in the majority of cases, but each is preceded at the normal interval by a "P" deviation, unless there is associated heart block. The forms of the deviations are constant as the excitation waves have traversed the normal paths.

Auricular flutter should be suspected in recurring attacks of tachycardia in which the pulse is fairly regular in rate and force or attacks in which excessively rapid jugular pulsations are noted, though the pulse is much slower and is regular or shows a distinct rhythm in its irregularity. The pulse of auricular flutter frequently shows alternating weak and strong waves as the ventricles become exhausted from the excessive rapidity. The diagnosis of this form of irregularity is frequently impossible without graphic tracings.

Auricular flutter is most frequently found in elderly persons with chronic fibroid changes in the heart muscle. It may occur at almost any age and indicates myocardial degeneration. Short paroxysms may occur or it may persist for months; often with resulting decompensation and frequently passing into auricular fibrillation. The onset is frequently sudden, following slight exertion. The patient is usually conscious of the tachycardia. Dyspnoea, vertigo, and even syncope may be produced. It is probably the cause of the majority of attacks of paroxysmal tachycardia.

AURICULAR FIBRILLATION.

Auricular fibrillation (*delirium cordis*) is characterized by complete irregularity of the arterial pulse and absence of normal auricular contractions. The auricle is dilated and unable to contract in an efficient manner and the individual muscle fibers fibrillate with resulting oscillations in the jugular tracing at the rate of 7 to 10 per second. Myriad feeble impulses crowd upon the ventricles, which

respond as rapidly as they are able with resulting rapid, irregular, and unequal contractions. Eventually some degree of heart block may develop or be produced by digitalis, and the ventricular rate may become slow and fairly regular though the auricles continue to fibrillate.

The polygram fails to show any normal "a" waves, and there is a complete irregularity in rate and amplitude of the arterial waves. Occasionally the rapid venous oscillations may be manifest in the phlebogram.

In the electrocardiogram there is absence of normal "P" deviations, and the ventricular complexes vary in rate and amplitude. Rapid and irregular oscillations may be manifest, especially during the intervals between ventricular contractions.

Auricular fibrillation can usually be diagnosed without graphic tracings. No other form of irregularity produces a pulse that is so completely irregular in the time and force of its waves. The ventricular rate is usually 90–140 per minute, but frequently some of the waves are too feeble to be manifest at the wrist and the rate there may be less than one-half that heard over the heart. On taking the blood-pressure reading there will be considerable difficulty in getting the systolic level and at this level only a small part of the waves will have force enough to get through. As the pressure is lowered, more and more of the waves may be heard at the elbow. When jugular pulsations are visible the only ones seen will be synchronous with the ventricular contractions. The patient may feel the fluttering or irregularity especially after exertion. Shortness of breath, cyanosis, and dropsy may also develop. Exercise tends to increase the irregularity.

This condition accounts for 50 per cent of all cases of persistent irregularity of the heart and is present in 60 to 70 per cent of all cases of heart failure with dropsy. It is most often encountered either in young adults with rheumatic valve lesions or in elderly persons with chronic myocardial degeneration. It may be found in pneumonia, diphtheria, or malignant endocarditis and in the terminal stages of many exhausting diseases. It usually indicates serious myocardial degeneration and is quite often associated with mitral stenosis.

The prognosis depends upon the cause and what we can determine about the efficiency of the heart muscle. When the pulse is rapid and the heart dilated the prognosis is very poor. Fibrillation usually comes on gradually and persists for the remainder of the patient's life. It may appear suddenly and for short periods only, but it tends to recur and finally becomes permanent. These patients seldom have definite attacks of angina pectoris. It is in cases of fibril-

lation that the digitalis group of drugs produces its most excellent results and under proper dosage and management they may live for a number of years.

PULSUS ALTERNANS.

Pulsus alternans is characterized by alternately strong and weak ventricular impulses occurring at regular intervals. It indicates depressed contractility. The ventricles are not able to respond with equal force to the impulses received.

The polygram will show regular rhythm but alternating heights of the arterial waves. The electrocardiogram shows alternation in the amplitudes of the "R" or "T" deviations, or both; especially in height.

Graphic tracings are usually needed to diagnose this condition. Such subjective symptoms as may be present are usually due to associated conditions. Use of the arm band of the sphygmomanometer may be made to bring out the difference in strength of the alternate pulse waves.

It usually occurs in patients past middle life with some degree of myocardial degeneration. It may be found in rheumatism, pneumonia, or other acute infections resulting in cardiac exhaustion.

Pulsus alternans is of great prognostic importance. Its significance is particularly serious if it occurs in persons with known cardiac disease when the heart is beating at about the normal rate. It is often associated with attacks of angina pectoris and paroxysmal tachycardia. Its temporary appearance after tachycardia will vary in its significance with the cause of the tachycardia. Depression of contractility by digitalis may occasionally produce it.

PAROXYSMAL TACHYCARDIA.

Paroxysmal tachycardia is characterized by abrupt onset of a rate of 150 to 300 per minute and its equally sudden cessation after a period that may last only a few minutes or may persist several weeks. The impulses are believed to originate in the auricles or ventricles and not in the pacemaker.

The polygram and electrocardiogram show that these paroxysms may be due to different causes, but nearly all attacks can be identified as auricular fibrillation, auricular flutter, or repeated extra systoles.

These forms of tachycardia, unlike those originating in the pacemaker, are not markedly effected by exercise. The pulse may be regular or irregular, depending upon the cause. The blood pressure is usually low and the jugular veins distended and rapid pulsations

visible. Weakness, pallor, dyspnoea, precordial pain, nausea, vomiting, cyanosis, and edema of the lung bases may develop.

The etiology is similar to that of its usual causes. In some cases no evidence of organic change can be found. Intestinal toxemias, reflex irritations, and neurasthenic states may be attended by such attacks. Exertion, emotion, and flatulent distention often usher in the attacks.

Death during an attack is unlikely unless the attack is much prolonged. Return to the normal rhythm is usually sudden and attended by rapid disappearance of subjective symptoms and passage of considerable quantities of urine and flatus. Cases presenting most alarming symptoms may improve with startling rapidity after cessation of the abnormal rhythm.

This article is intended as an introduction to a very interesting subject for those who have not had previous opportunity to study it and as a quick reference for those who have infrequent use for such information.

THE HANDLING OF RECRUITS AT THE RECRUIT DEPOT, MARINE BARRACKS, PARRIS ISLAND, S. C., WITH SPECIAL REFERENCE TO PHYSICAL EXAMINATION.

By J. C. PARHAM, Lieutenant Commander, Medical Corps, United States Navy.

Recruits arrive at Parris Island twice daily. Immediately after arriving they are examined by a medical officer for evidences of contagious and infectious diseases. This examination having been completed they are given dinner or supper, depending upon the hour. The usual hours of arrival are 11 a. m. and 7.30 p. m., but in case of delay in trains, no matter what the hour, the recruit always finds a well-prepared and attractive meal awaiting him. This is in line with the general policy of the recruit depot of making the conditions surrounding the man while awaiting enlistment as attractive as possible in order that he may not become discouraged and repent his decision to enlist in the Marine Corps. In furtherance of this general policy the recruit, while awaiting final disposition of his case, is supplied with athletic gear and the unlimited use of an athletic field. Moving-picture shows are given nightly, the show consisting of two comedies and a feature picture. This carries the recruit through the day. After breakfast he reports to the medical officers for final examination, which is generally completed by noon, except in the case of men requiring additional observation and examination. He is now given cowpox vaccination.

Physical examination.—Physical examinations are conducted in a ward of one of the standard type regimental sick bays. The equip-

ment includes scales, measuring devices, electrical instruments for the examination of eyes, ears, etc., vision test sets, etc., conveniently arranged. The Medical Department personnel of the recruit depot consists of two medical officers, a pharmacist, and several hospital corpsmen. One hospital corpsman is detailed as recorder. Recruits are stripped and each man is given a number; this is painted on his chest with tincture of iodine, and while in the examining room he is known by this number. This is done to facilitate the work of the recorder of the examination and to prevent confusion and error in case two or more men have the same surname. They are then lined up and addressed by the medical officer. Considerable importance is attached to this address, since cold, hard facts are told in terms easily understood by any recruit. The lecture lasts for 15 minutes and the following points are brought out and emphasized:

(a) Duty in the Marine Corps involves hard work as well as pleasure; marines play a man's game, and in the Marine Corps there is no place for the weakling. The service is not for the purpose of making men out of boys but of making better men out of good men.

(b) They are reminded of the fact that they signed a paper at the recruiting office before being sent to Parris Island in which each stated "I have nothing wrong with my health or body that the doctor did not find when he examined me." It is suggested that perhaps they considered the signing this paper lightly, or perhaps had not realized that some physical defect or ailment might rapidly grow worse or increase as the result of unaccustomed physical exertion and training at the recruit depot—such as an ear that runs occasionally, a stiff joint that is not noticeable but that is not exactly right, a fit or fainting spell that the applicant has had, the scar of an old operation that has given trouble, or old fractures that give trouble. In this manner each portion of the body is touched upon and the more common injuries and ailments affecting the portions under discussion are mentioned.

(c) They are then told that they will be required to swear that they are physically fit and the penalties of perjury are explained to them. They are told that the Marine Corps does not cure fits or fainting spells, but that, on the contrary, physical defects are liable to be made worse by the period of training each man will undergo. They are told that bed-wetting will be detected, that venereal disease can not escape observation, and that the copy of the finger prints taken at the recruiting office will give the examiner accurate information of previous service in the Army, Navy, or Marine Corps, and that by this means a man who has been discharged on account of physical disability will be detected and punishment meted out to him if he conceals the fact. The lecture is concluded by inviting the ap-

plicants to render any statement they may care to make; they are told that the present time is the last opportunity that will be afforded them to "come clean," and that no punishment attaches to confession of facts they may have forgotten to tell the officers at the recruiting office or to which they attached slight importance, but that, after they leave the examining room and are sworn in, any facts that have been concealed will almost surely be detected and punishment administered.

Following this, each applicant is asked individually if he wishes to tell the examiner anything. Notes on former disease or injury, as related at this time, are made by the recorder and used to bring this information to the examiner's closest attention and to aid him during the subsequent examination.

The following routine of actual examination, which comes next, has been developed by long experience and permits the rapid and thorough examination of large numbers, such as are handled at the recruit depot almost daily.

(a) Applicants are formed in a line and numbered consecutively, No. 1 on the end. The recorder enters opposite each man's number the information given by the medical examiner.

(b) The line now passes before the measuring stick and over the scales, the examiner calling out: "No. 1, height —, weight —, chest —, expiration —, inspiration —."

(c) These having been taken, No. 1 toes the 20-foot line, and his vision is recorded, followed by No. 2, 3, etc.

(d) This being done, color vision is determined, both medical officers examining in order to expedite this process, which is, at best, time consuming. In this test Holmgren's method (colored worsted) is routinely used, the Jennings test being employed for confirmation and record in case of color-vision defects.

(e) The line is again formed, and hearing is tested.

(f) Following this, the examiners start through the line. A rapid survey is made of the recruit's head for evidence of old fractures, scars, and deformities; next the eyelids are everted and trachoma, corneal opacities, pterygium, etc., looked for; then comes a rapid palpation of the cervical and epitrochlear lymphatic glands, mastoid region, and thyroid gland, together with examination of the nose, teeth, and throat.

(g) The applicant then clasps his hands above his head, separates his feet, and is instructed to cough, and evidences of inguinal, umbilical, or post operative ventral hernias are sought.

(h) While in this position the external genitals are carefully examined.

(i) The applicant resumes the normal position and a rapid survey of the entire body and limbs is made for evidence of operation, or other scars, skin lesions, edemas, old fractures, deformities, varicose veins, etc.; and, lastly, the condition of the feet is observed for the presence of deformities, callosities, bunions, flat foot, and pes cavus. All feet are not measured. An experienced examiner can readily judge from a very rapid inspection of the foot as to whether it is absolutely good, hopelessly bad, or requires careful examination and measurements before decision. In determining flat feet the following points are noted, the applicant standing normally: The angle of the foot with the leg, in the antero-posterior and lateral planes; the prolongation of the line of the tibial crest; curvature, if any, of the tendo Achilles; the location of the scaphoid tubercle with relation to Feiss's line; the amount of descent of the tubercle upon placing weight on the foot, and, lastly, the imprint of the foot. The latter can be determined by noting the points of contact of the foot with the floor as shown by soiling after walking and standing on the bare floor of the examining room. This point, when considered alone, is of no value, since, as is well known, pes cavus will give an impression indicating an excellent foot while, on the contrary, a fat foot of excellent bony and ligamentous structure may give an imprint indicating marked flat foot. For these reasons the other points mentioned are of first importance, showing, as they do, the condition of the ligaments and articulations of the bony structure.

(j) These steps being completed, the examiners pass behind the line of applicants who bend forward touching the floor with hands and with feet spread apart. The spinal processes of the vertebrae are palpated and evidence of anal fistula, hemorrhoids, etc., sought.

(k) This procedure is followed by an examination of the ears using the electric otoscope.

(l) Following this comes the examination to determine the mobility of joints. The movements prescribed in the Manual for the Medical Department of the Navy are employed.

(m) Next the lungs and heart are carefully gone over. This is the most time-consuming of any of the procedures undertaken, especially in view of the large percentage of men who are borderline cases. The examination of the heart is concluded after making the applicant do a vigorous "full sweep" for a period of one minute. This is highly important, since under the influence of strenuous exercise information as to the condition of myocardium and valves is often obtained that can be ascertained in no other way, i. e., murmurs of organic origin, irregularity of action, response to effort, and time and manner of return to normal.

(*n*) During the period of the examination a rapid fire of questions is directed at the applicant for the purpose of detecting any speech defect, ascertaining family and personal history, and educational qualifications. From his answers and manner of replying opinions are formed as to his mental status.

(*o*) Throughout the examination the recorder stands by and notes any defect or abnormality discovered by the medical officer. If the defect is such as to constitute a bar to enlistment, the applicant is marked "Reject"; if of less import, the applicant appears before both examiners upon completion of the routine examination, when the defect is carefully examined and, after discussion, decision is made as to the final disposition of the case. Similarly, all candidates marked "Reject" are given a final examination by both examiners with special reference to the discovered defect before final action is taken. It will be understood that all minor defects are recorded and that upon summarizing these defects they may, in the aggregate, constitute sufficient cause for rejection, even in the absence of a major defect.

(*p*) The information required for health records is then obtained and recorded on a form, printed on regular size, official correspondence paper, and it bears on the left a copy of the descriptive list from the health record. The notes, made by the recorder during the examination, are entered on the wide margin to the right and later transferred to the smooth descriptive list in the health record. Notes would embrace slight spinal curvature, slight varicocele, a relaxed inguinal ring, perianal skin tags, feeble chromatic sense, etc., and conditions that should be noted for record under "Marks and scars." Upon completion of this form it is sent to the hospital corpsman in charge of records, where it is used in the preparation of the original and the copy of the descriptive list of the health record. It is then attached to the health record and placed on the medical officer's desk to be used for checking the health record.

(*q*) Requisite entries are made in the service record book and finger prints taken. The recruit who is physically qualified now passes to the line recruiting officer where his enlistment is completed, unless disqualifications other than physical are discovered.

Those who present physical defects are held for special examination. This may require but a few minutes, or a period of hours on successive days. The methods employed in determining an applicant's fitness are only limited by the examiner's professional skill and the paraphernalia available at the recruit depot and the naval hospital. Recruits with heart lesions have blood-pressure readings made before and after exercise, they are put through the usual tests to determine whether a lesion is organic or functional, and whether of the

valves, nervous structure, or the musculature. Urinalysis is done in these cases. Eye cases are carefully refracted and examined with the ophthalmoscope when necessary. Ears are carefully examined and in case of a moist drum in which a small perforation is suspected, but not visible, the simple expedient of placing one end of a rubber tube in the applicant's ear and the other end of the tube in the examiner's ear and having the applicant inflate the middle ear is employed. This test is of value only when positive, as air can be heard to whistle through the drum; there is always the possibility that the applicant can not inflate the middle ear, or greatly desires to enlist and will not inflate it. Under these circumstances the tube is left in situ and a eustachian catheter passed into the canal and the middle ear inflated with a Politzer bag when, if a perforation exists, the passage of air through the drum can be plainly heard.

In cases suspected of having tuberculosis, sputum, if obtainable, is examined and temperature charts started to continue until the examiner is satisfied of the nonexistence of the disease. These patients, if borderline cases, are also X-rayed.

In brief, every case is gone into thoroughly if any suspicion exists that the defect may be such as to require rejection.

Before being sworn in all applicants are given a lecture by the commanding officer of the recruit depot. The history of the Marine Corps is sketched and the attempt is made to lay the foundation upon which loyalty to the Government and service and "esprit de corps" may be subsequently erected. At this time the life of the marine is described and the rewards for faithful and conscientious service are set forth and contrasted with the penalties and odium attaching to the military offender. The men are now sworn in and equipment, clothing, arms, etc., issued. This being done they are given the first injection of typhoid prophylactic and transferred to the detention camp in the training station, where typhoid prophylactic and cowpox vaccination are completed during the period of detention.

The day after reporting at the detention camp the men report by companies to the dental officer, teeth are examined and dental records prepared. Immediately thereafter dental work on the company begins and is continued until every man has all necessary dental work completed. For this purpose men report in squads of from 6 to 8 in order to interfere as little as possible with the recruit training.

It will be noted that the routine employed in the physical examination covers every portion of the body and is substantially that contained in chapter 12, Instructions to Medical Officers, United States Navy. The routine may be modified to suit the individual examiner, but it is of the utmost importance to have a fixed routine of examination, since otherwise the examination will not always in-

clude every portion of the body and defects will be overlooked. The examiner should establish one routine and follow it unvaryingly until it becomes automatic.

It is believed that the greater portion of rejections at the recruit depot are the result of a lack of routine in examination. When an applicant, after being examined by a medical officer on recruiting duty, is found to have a discharging ear, with perhaps inspissated wax that gives evidence of long aural residence and requires the undivided attention of the medical officer for an hour or more to effect its removal, the conclusion is easily reached that the medical officer at the recruiting station has not examined that ear. This is not a far-fetched example; fully 5 per cent of the applicants received at the recruit depot have cerumen inspissated to an extent that is proof positive that the tympanum was not seen by the medical officer at the recruiting station. The usual alibi advanced in lieu of explanation is "this defect was not discovered at this office." Comment is unnecessary.

A survey of the Forms X submitted from the recruit depot shows numerous rejections for conditions such as undescended testicle, otitis media with perforation of the tympanum, large hydrocele, large varicocele, ankylosed joints, hernias, deformities of feet sufficient to interfere with the performance of duty, marked enlargement of the thyroid gland with evidence of thyro-toxicosis, defects of vision, color blindness, marked cicatricial contraction of skin and muscle interfering with motion, marked underweight, patients in the last stages of tuberculosis, etc. The conditions enumerated do not admit of conflict of opinions, they are positive indications for rejections and, as such, should never pass any medical officer who is conscientious enough to carefully examine an applicant. Defects such as heart lesions, incipient tuberculosis, slight varicose veins, slight thyroid enlargement, hemorrhoids, moderate flatfoot, relaxed inguinal rings, spinal curvature, etc., are not included in the foregoing, since they admit of differences of opinion between the medical officer of the recruiting station and the medical officer of the recruit depot.

It may be stated that the majority of rejections are due to two general causes, carelessness and failure to observe instructions.

Instructions governing the physical examination of recruits and applicants are explicit and should be thoroughly known to any medical officer on recruiting duty, and they should be followed to the letter.

Gatewood remarks that the health of the service is primarily in the hands of the recruiting officer. The writer has constantly observed the truth and aptness of this statement and suggests it as a slogan for every medical officer examining men for the Navy and Marine Corps. It may be further stated that the annual appropriation for

pensions accurately mirrors the thoroughness in performance of duty of medical officers on recruiting duty. Careful examination, following an established routine, will prevent 80 per cent of the rejections for physical defects at the recruit depot.

Orders issued by the Major General Commandant under date of March 15, 1921, direct that henceforth the minimum height and weight requirement shall be 65 inches and 130 pounds, respectively, and that ordinarily no waivers will be submitted, except in the cases of former marines. These orders have been, in many instances, disregarded. In the case of reenlistments in the Marine Corps the man is sworn in at the recruiting office and the enlistment is thereby completed; but he is transferred to the recruit depot where he is given the routine examination. Many reenlisted men, so received, present physical defects that are positive contraindications to enlistment or reenlistment and for which even waivers have not been requested.

Again, it is noted that waivers submitted from recruiting stations do not accurately set forth the physical defect. For instance, a varicocele will be described as slight or moderate, whereas, it is very large; underweight will be grossly misstated; curvature of the spine will be represented as slight, whereas it is marked; varicose veins will be represented as slight and the applicant present marked varicocities with evidence of old ulcerations, etc.

Medical officers should realize that the fact of a defect being waived does not influence the medical officer at the recruit depot when the condition has not been accurately represented. In these circumstances the bureau is advised of the actual conditions and requested to cancel the waiver or to waive the disability, depending upon its extent. Men with waivers are not enlisted under any circumstances without the prior approval of the bureau unless the waiver accurately describes the condition. Again, many men are sent to the recruit depot with defects for which waivers *should have been requested at the recruiting station*. It should be realized that an accurate description of a physical defect transmitted to the bureau, via telegraph, is less expensive by far than transporting the applicant to Parris Island, where he may be rejected and returned at Government expense to the recruiting office or held for several days at Government expense while awaiting action on a waiver submitted from Parris Island.

At the present time medical officers are evidently interpreting the Major General Commandant's orders of March 15, 1921, with reference to waivers as meaning that waivers are no longer necessary. Applicants with physical defects that should be waived continue to arrive.

A brief summary of the cost in connection with rejected applicants during the last fiscal year is presented:

Total applicants rejected for military and physical reasons.....	1,298
Total applicants rejected for physical reasons.....	668
Percentage applicants rejected for physical reasons.....	51.46
(a) Railroad fares, meals, and sleeping accommodations for rejected applicants.....	\$54,272.98
(b) Rations at recruit depot.....	6,360.20
(c) Return transportation furnished rejected applicants.....	32,303.42
Total	92,936.60
(d) Total cost of applicants rejected for physical defects only.....	¹ 47,825.17
(e) Average cost per rejected applicant.....	71.60

The foregoing does not include the very considerable item of telegrams from Parris Island in connection with waivers, ascertaining facts regarding criminal history, previous military service, etc. With the service ration at 50 cents, telegrams, while expensive, are far less so than rationing a man for the days necessary to obtain information via the slower process of the mails.

Attention is invited to the fact that the foregoing summary of expense in connection with rejected applicants does not include the cost at the recruiting station of rationing at 75 cents per meal and providing sleeping accommodations for applicants while awaiting transfer to the recruit depot. While figures covering these expenditures are considerable, they are not available.

In conclusion, it should be stated that the sole object of the medical examiners of the recruit depot is to certify as physically fit for enlistment only those men who in their opinion are capable of performing the duties of a marine and who are free from defects liable to place them in a pensionable status. To this end the very earnest cooperation of the entire recruiting staff should be directed. It is believed that the duty performed by a medical officer at a recruit depot is a specialty, and that after a short period of such duty he gains knowledge of physical defects, personalities, etc., that can not be had elsewhere. At this recruit depot the senior medical examiner is a member of all boards of medical survey, and thus he observes the men he has previously examined and who have been unable because of physical defects to complete the period of training. Correlating the information obtained in the examining room and that obtained as a member of a board of survey gives an insight into physical defects that is of incalculable value to the examiner and impresses upon him the importance of every medical examiner making a careful physical examination of each applicant who comes before him in the recruiting office.

¹ Applicants rejected for physical defects have transportation furnished to the recruiting station, whereas, the majority rejected for military reasons are not furnished return transportation. This accounts for the apparent discrepancy in cost when the percentage rejection for both causes is considered.

FOUR CENTURIES IN THE TREATMENT OF SYPHILIS.

By L. W. SHAFFER, Lieutenant Medical Corps, United States Navy.

ORIGIN OF SYPHILIS.

According to the work of Thomas Rangonius (1508) the great epidemic of syphilis first appeared in Galacia, Spain, and was therefore named "Morbus Galecum." It raged throughout Spain in 1494, and in the same year the whole of Italy was affected. In 1495 France, Germany, and Switzerland, became the sites of virulent outbreaks; Holland and Greece in 1496, England and Scotland in 1497, Russia and Hungary in 1499. The disease was first recognized in India after the arrival of the crews of Vasco da Gama (Portuguese) at Calicut in 1498. In China according to U-Pin (1550), syphilis broke out in epidemic form in Canton in 1505, as the result of the visit of a European trader.

Opinion has favored the theory that syphilis was introduced into the Old World by Christopher Columbus on his return from America. Its spread over Europe was facilitated by the armies of Charles VIII of France, made up of mercenaries from many countries, including Spain, both during its invasion of Italy in 1494, and after its disbandment in 1495. It is probable that Columbus was the first to introduce syphilis into the Old World, or he may have introduced merely a new and virulent strain.

THERAPY OF THE EARLY PERIOD.

Syphilis had probably been known in Espanola (Haiti) from time immemorial. At the time of the arrival of Columbus the Indians were already in possession of a highly complicated, rationally developed and deduced method of cure of this ailment, the details of which Diaz de Isla learned in the year 1504 from a translation. This consisted chiefly in treatment by guaiacum and other vegetable drugs, in conjunction with hydro-therapeutic, dietetic, and climatic methods of treatment.

The first manifestations of the great epidemic of syphilis of the fifteenth century were not treated at all, having been a complete surprise to the physicians of that period. It was considered disgraceful for a practitioner to occupy himself with such a disease. This was mainly due to their complete ignorance of a disease unknown to Hippocrates, Galen, or Avicenna. It was treated by druggists, herbalists, and imposters of all kinds. The abuse was so great that at last physicians became ashamed of neglecting their duty and undertook the treatment of the scourge. This consisted, at first, in diet, hygiene, bleeding, laxatives, juices of herbs, together with baths, sweating, and various kinds of ointments.

Mercury came into use very early. Introduced into therapeutics by the Arabian physicians Rhazes, Avicenna, and Mesue, it was employed in the treatment of various cutaneous affections. Analogy naturally led to its employment for syphilitic eruptions. Various forms of mercurial ointments were proposed by different physicians as early as 1497, especially by Berengario da Carpi and Jean de Vigo. In a satirical poem by G. Samarissa, of Verona, mention is made of the use of mercury in 1496. At the very first the effects of this agent were dreaded and the doses given were small, but the dosages used rapidly increased, together with excessive and repeated inunctions until the remedy became worse than the disease. This method of treatment then fell into discredit, to which the importation of guaiacum from Haiti (1508-1517) further contributed. From that time dates the famous discussion of the advantages and disadvantages of the mercurial preparations.

Mercury was at first used externally only. There were four ways of using it, says Astruc; as a plaster or cerate, as a wash, as an ointment or inunction, and in perfumes (fumigation). About the year 1535 Pietro Andrea Mattioli first ventured to give mercury internally administered in the form of red precipitate. Following discoveries in chemistry, many different forms were administered, but regrettable excesses in dosage were committed. Convinced that salivation was necessary as a price of health, and was the only means of eliminating the poison of the disease, they sought above all things to produce it. It was not until the first part of the eighteenth century (Chicoyneau 1718) that an effort was made to demonstrate the inutility of salivation in the treatment by mercury, but this reform did not triumph for many years.

Guaiacum was known in Spain as early as 1508, and according to Delgado reached Italy and Germany about 1517. It then came into rapid general use. It was used as an infusion in various strengths, combined with a strict diet. Among other sudorific woods in popular use were holy wood from India, and cinchona, introduced into Europe about this time (1536-37). Then came the use of sarsaparilla, sassafras, canella bark, saponaria, bittersweet, germander, hyssop, citron, oranges, and lemons. However, the sudorific woods and plants soon lost much of their reputation, and by 1564 Fracanziani states that many clever physician had been obliged to have recourse again to mercurial inunction. In the seventeenth century guaiacum was still in use, but the physicians of the eighteenth century, with few exceptions, abandoned it almost completely and had recourse to mercury. Astruc declared, like many others, that the sudorific woods were incapable of curing any but local and commencing venereal diseases.

The identity of the different venereal diseases, and the modes of attack and characteristics of syphilis, were fairly well determined by scientific study on the part of numerous workers of this period, including Fernel (1496–1558), Gabriele Fallopio (1523–1562), Ambroise Paré (1510–1590), Gregory Horst (1575–1636), Lancisi (1654–1720), and Jean Astruc (1684–1766). The publication in 1736 of Jean Astruc's classical work, *De Morbis Veneris*, constitutes a landmark in the history of syphilis. He contributed little, but brought together all the existing knowledge of the subject.

THE HUNTERIAN PERIOD.

The culminating point in the period of retrogression in the scientific knowledge of syphilitic affections is probably occupied by John Hunter, who, inoculating himself with the pus from virulent gonorrhea, produced a chancre as well as constitutional syphilis, from which he concluded that the virus of all three diseases, gonorrhea, chancre, and syphilis were identical.

In regard to treatment, Hunter says: "As the three forms of venereal infection, gonorrhea, chancre, and the lues venerea, all arise from the same poison, it would be natural to expect that one medicine, whatever it would be, would cure all forms of this disease. But we find from experience that this does not hold good; for one medicine, that is, mercury, cures only the chancre and the lues venerea, and the gonorrhea is not in the least affected by it; and what is still more remarkable is that the two which it cures are in no respect similar, while the gonorrhea, which it does not cure, is similar in some respects to the chancre, which it does cure.

"If there is such a thing as a specific, mercury is one for the venereal disease in two of its forms. Yet mankind are in pursuit of other specifics for the disease, as if specifics were more common than diseases; while at the same time they are too often contented with the common mode of treating many other diseases for which they have no specific" (1).

The history of syphilis from Hunter's time (1728–1793) was one, first of confusion, then of gradual groping for the light.

In a work written in 1661 Simon Pauli gives an account of the cure of a case of syphilis by the use of opium, but it was not until near the end of the eighteenth century that opium acquired all at once a certain popularity in the treatment of the disease, and came into use in massive doses. About the same time oxygenized substances came into wide but transient use. The treatment without mercury, so popular in the first quarter of the nineteenth century, was due probably to the failure to differentiate between various venereal diseases, following the ideas of Balfour, Hunter, Adams,

and Carmichael. It was soon followed by a return to the general recognition of mercury, along with the better differentiation of venereal diseases, and the disproving of the Hunterian theories.

MODERN SYPHILIS.

The history of modern syphilis begins with Philippe Ricord (1799–1889), the great experimenter and pioneer in genito-urinary diseases. He disproved John Hunter's theories, worked out the three stages of syphilis, emphasized the differentiation between hard and soft chancres, and helped prove the contagiousness of secondary syphilis. He, with his pupils and followers, established the fundamental part, and the larger part, of our present knowledge of syphilis.

In therapeutic lines Ricord is the founder of the French school of mercury by mouth medication. He preferred the use of proto-iodide pills, and says of their use: "The most powerful way of action is by way of the intestinal canal, the application by the skin is far inferior and ought only to be employed when the bad state of health of the digestive organs will not allow the direct introduction of the medicament" (2).

Iodine and its compounds had not long entered the domain of therapeutics when they were employed for the cure of syphilis. Inspired by the practice of Gertanner, who gave burnt sponge for venereal ulcers of the throat, Martin, of Lubeck, conceived in 1821 the idea of substituting iodine for the sponge and obtained good results from it. Wallace, of Dublin (1834), has the honor of having been the first to employ iodide of potassium, to fix its dosage, and to point out the indications for its use. He thereby definitely introduced iodine into the therapeutics of syphilis and placed it almost on a level with mercury.

The idea of the so-called "syphilization," promulgated by Diday (1812–1894), was essentially the cure of syphilis by repeated inoculations of the same infected person with syphilitic virus, until immunity was produced. It was studied by many workers, who failed to obtain any therapeutically valuable results. These studies, however, resulted in the knowledge that the products of syphilis are only rarely inoculable upon the patient, or upon other syphilitic individuals.

The influence of Ricord gave rise to two great French schools of syphilology; those of Diday and of Fournier. It was largely through the work of these great syphilographers and their disciples that the clinical knowledge of syphilis has been brought to its present state. Diday gave his attention to the problems of congenital syphilis, while the work of Fournier ranged over the whole field of syphilis, and he

was probably the greatest clinical syphilographer that the world has produced.

Fournier advised that the treatment of syphilis be carried out "with truly active and curative doses of mercury and potassium iodide, the duration of treatment not to fall below three or four years however benign the original diathesis may have been." This he considered the necessary minimum, not, as he says, to cure the disease but to avert its dangerous manifestations both for the present and for the future. In addition he advised a course of iodide treatment every two or three years to keep the disease in check and to hold the ground gained (3).

DEVELOPMENTS OF THE TWENTIETH CENTURY.

The most astounding advance in the diagnosis and treatment of syphilis came with the scientific discoveries of the early twentieth century. Metchnikoff and Roux in 1903 succeeded in transmitting syphilis to monkeys. On March 3, 1905, Fritz Schaudinn discovered the origin of syphilis in one of the protozoa, the *Spirochæta pallida*. In 1906 Wassermann applied the Bordet-Gengou phenomenon of complement fixation to the diagnosis of syphilis. The commanding intelligence of Ehrlich applied ideas of chemotherapy, with the startling result, salvarsan, in 1909 (4).

The ingenious suggestions of Swift-Ellis, on the use of the intra-spinal salvarsanized serum, and the finding of *Spirochæta pallida* in paretic brain tissue by Noguchi and Moore became known in 1912. The knowledge of the colloidal gold reaction, obtained from the ideas of Thomas Graham concerning colloids and developed by Szigmondi, was effectively applied by Lange in 1913.

Until the discovery of the *Spirochæta pallida*, there were two opinions as to when to begin the general treatment of syphilis. In one the specific therapy was begun as soon as possible after the recognition of the primary affection; in the other, it was believed necessary to wait until the appearance of the secondary symptoms. This latter view was held by the majority, because they believed that the action of mercury was more lasting in the general syphilitic stage, that it had never been possible to arrest the disease by early treatment, and, above all, that it was impossible to make an absolute diagnosis before the roseola appeared. This hesitation in diagnosis, however, has disappeared with the discovery of the *Spirochæta pallida* and the Wassermann reaction. Hoffman was able to prove that the blood from syphilitic patients taken two weeks before the appearance of the general eruption induced syphilis in apes. Neisser proved by inoculation experiments that the internal organs of apes contained syphilitic virus at the time of the appearance of the primary lesion and often much earlier. It is therefore necessary

to begin the general treatment as soon as syphilitic infection has been proven by the presence of the *Spirochaeta pallida*.

Unfortunately the great expectations of salvarsan, as a result of the first enthusiastic and favorable report of Alt, Wechsellmann, and others, were only partly fulfilled. It was soon learned that Ehrlich's arsenic preparation did not effect a complete cure in the sense he anticipated, and certainly this end can not be obtained, and should not be expected in such a chronic and complicated disease as human syphilis. Armed with the laboratory aids to diagnosis and the addition of salvarsan and its allied preparations, we have then to see what the last 10 years have brought forth regarding the therapeutic management of syphilis.

PRESENT STANDARDS IN THE THERAPY OF EARLY SYPHILIS.

Realizing that the hope of a radical cure of syphilis by a few injections of salvarsan was impossible, and yet recognizing its extreme value in the treatment of syphilis, many methods and systems of treatment have been advocated. Time already has proven many of these inadequate or dangerous. When it is realized that salvarsan has been in general use in the treatment of a disease so chronic and complicated for only 10 years, it is easy to see that many years of observation of treated cases and large numbers of well-kept records with each of the systems now in use, will be necessary before any standard of treatment can be universally adopted. In this paper an endeavor has been made to bring together some of the various methods of treatment as advised by physicians of wide experience. Abortive treatment and that of early syphilis only have been considered, as the general subject is too large to cover in a paper of this nature.

At the present time the temperate opinion of the world recognizes that the prompt eradication of syphilis by specific treatment is only likely to be successful in the early weeks of the disease. If the disease is recognized within the first 10 days after the appearance of the chancre, vigorous treatment then begun has an excellent prospect of aborting it. This prospect rapidly diminishes after the first 10 days, and after the disease has become systemic to the point of producing the secondary eruptions, the prospect of quick cure by specific treatment with salvarsan and mercury has almost vanished.

MERCURY.

The moderate systemic and temperate use of mercury developed under the French school, led by Dupuytren, Ricord, and Fournier, and by Jonathan Hutchinson in England. The intensive methods of administering mercury in vogue at the present time, by inunction and

particularly by injection, are due to the insistence of the modern German school.

Three types of treatment with mercury have obtained general recognition—the continuous, the symptomatic, and the intermittent forms. The intermittent treatment, now the most widely accepted method, alternates the periods of intensive therapy with periods of rest. Certain considerations in regard to the physiological or toxic effect of mercury on the blood, kidneys, gastrointestinal tract, mouth, and teeth seem to make the intermittent form the most rational.

When administering mercury by mouth the various preparations are probably of value in the following relative order: Mercury with chalk, bichloride of mercury, and the protoiodide and biniodide of mercury. There can be little question but that the efficiently applied inunction is the best available method for the administration of mercury in syphilis and has the advantage that it is not cumulative. When using mercury by injection the employment of the soluble salts has the advantage of fixed dosage, rapid availability, and ease of control of the toxic symptoms should they arise. They have, however, to be administered at daily or at the most short intervals, which constitutes their main objection. The insoluble salts are administered at intervals of from five days to one week, but they are distinctly cumulative, and their absorption is slow. The studies of Schamberg, Kolmer, and Raiziss show that at the end of six or seven weeks almost 50 per cent of the mercury may remain unabsorbed at the site of injection and that weekly administration leads to cumulation of the drug in the tissues. For rapid effect with little cumulative action, therefore, soluble salts are to be recommended (5).

IODIDES IN THE TREATMENT OF SYPHILIS.

The iodides do not apparently affect the organism of syphilis, and for that reason should not be regarded in any sense as a substitute for mercury or salvarsan. Their function is that of promoting lysis and absorption of granulomatous and newly formed fibrous tissue, whose development is one of the pathological changes induced by the presence of the *Spirochæta pallida* in the body. The administration of iodides may in general be begun in the early secondary stage of syphilis in order to combat the fibroses from the very beginning. In order to prevent meningeal irritation and neuro-recurrences, Pinkus recommends large doses of potassium iodide in secondary syphilis, accompanied by involvement of the central nervous system. The most striking results are apparent, however, in the treatment of gummatous infiltration and have no place in this paper. It should invariably be administered in conjunction with mercury, whose germicidal action upon isolated spirochaetes is aided by the breaking down and absorption of infiltrates.

SALVARSAN.

Several preparations with essentially the same base are now in use; old salvarsan or arsphenamine, neosalvarsan or neoarsphenamine, sodium salvarsan, and silver salvarsan. Of the relative values of salvarsan and neosalvarsan much has been written and each has its champions. According to the results of experimental studies of Schamberg, Kolmer, and Raiziss, 0.6 gram arsphenamine equals 1.05 grams of neoarsphenamine in therapeutic activity, and they consider 1 gram of neoarsphenamine to have a greater margin of safety than 0.6 gram arsphenamine, although the latter has a trypanocidal activity 1.74 times greater than neoarsphenamine (6). Much work has been done recently with the latest preparation, silver salvarsan. It is reported less toxic, is used in smaller dosage, and is more soluble than the older salvarsan, and is seemingly as effective, but the few cases of argyria that have been reported following its use have led most men to be skeptical of it.

When salvarsan was first introduced injections of the neutralized drug were made subcutaneously, but the frequent occurrence of sloughs and the painfulness of this method led to its being abandoned. Deep intramuscular administration was then substituted and it still has occasional advocates, such as Wechselmann, Eicke, and Sutton. On the whole, however, both experimentally and practically, the intramuscular injection has proven to be less satisfactory than the intravenous.

In general, the average adult subject should receive no more than 0.3 gram of old or of neosalvarsan at the first injection. One week between injections is the usually accepted interval, although Sicard, Pollitzer, Ormsby, and others shorten this interval even to one day, and Neisser insists on 10 days between the larger doses. The average dose of salvarsan after the second or third is, according to Fordyce, Wechselmann, Tomaszewski, and Neisser, between 0.2 and 0.5 gram. Gennerich employs somewhat larger doses. Kromeyer thinks the single dose of salvarsan should not exceed 0.4 gram. Leredde, who believes salvarsan capable of curing syphilis without the use of mercury, employs doses of neosalvarsan as large as 1.2 grams at the end of a course. Dreyfus urges high total dosage amounting to even 5 or 6 grams in a period of six to eight weeks. Such large dosage is, however, losing instead of gaining favor. The general practice now among conservative workers is to use 2 to 3 decigrams for the initial dose with 4 and at a maximum 6 decigrams for subsequent weekly doses (4).

THE ABORTIVE TREATMENT IN EARLY SYPHILIS.

The possibilities of aborting a syphilitic infection is a conspicuous therapeutic advance which we owe to salvarsan. Many cases after 2

thorough course of abortive treatment fail to evidence the slightest sign of the disease after the most searching clinical and serological investigations. The strongest evidence in the favor of the possibility of an abortive cure is the fact now often observed of reinfection.

A certain percentage of the cases of reinfection undoubtedly represent local recurrences, and another group may perhaps be interpreted as superinfections. The literature now contains many reported cases of evidently bona fide reinfections by such men as Hoffmann, White (28 cases), Spangenthal, Goubeau, Levin, Kermorgant, Klaunder, and many others. Reported cases should fulfill the following requirements: The *Spirochaeta pallida* should have been found in both attacks, with a positive Wassermann reaction during the first infection and a negative reaction early during the second. Jacobi, in an article on reinfection and curability of syphilis, states that the question "Is syphilis curable?" can not be answered definitely in the light of our present knowledge, the occurrence of reinfection in syphilis must be accepted as an established fact, and that reinfection is by no means evidence of curability (7).

The first essential to an attempt at abortive cure is a prompt diagnosis of the primary lesion. Wherever syphilis can be recognized in the primary stage by the demonstration of the *Spirochaeta pallida*, abortive cure should be attempted. The prospects of success are brightest when the Wassermann reaction is still negative, so that not a day must be lost in instituting treatment. Levy-Bing and Gerbay (8) discovered that the Bordet-Wassermann reaction appeared always after a certain interval following infection. If abortive treatment is pushed before this interval has terminated, it has every prospect of success, but after the expiration of this period treatment may retard the appearance of a positive Wassermann reaction but does not prevent its becoming positive sooner or later. This interval is 37 days in length. It is followed by a period of 8 days, in which the outcome is dubious; after the forty-fifth day no treatment will ward off a positive reaction. Hence they conclude that effective abortive treatment can not be expected after the thirty-seventh day.

Abortive treatment should not be undertaken in individuals in whom the use of arsphenamine or the most intensive employment of mercury is contraindicated. An examination of the urine, blood pressure, and cardiovascular system should invariably precede the first injection.

The technique of abortive treatment as employed by clinicians of large experience varies noticeably. Most of these workers now employ courses of treatment over a longer period than that which they formerly considered sufficient and believe it is a better policy to err on the side of over rather than of under treatment. A few of the

systems used by these various workers will be considered in this paper. Those in use for abortive cure and in the treatment of early syphilis are essentially the same. As we have no criterion for absolute cure except time, and as the best results are obtained by early treatment, most syphilographers are recommending repeated courses of treatment given frequently early in the disease. It is also well to recognize the value of Gennerich's postulate and restrict the rest interval to six weeks or less in order to prevent a Wassermann relapse.

Neisser (9) and Wechselmann (10) announced their systems of treatment in 1913. Neisser used two courses of combined salvarsan and mercury, and Wechselmann depended on neosalvarsan alone, giving 11 injections in 10 weeks. Hoffman (11), Leredde (12), and Gennerich (13) announced their systems in 1914. Hoffman employed five injections of salvarsan, followed by a course of mercurial inunctions. Leredde used neosalvarsan alone in doses from 0.15 to 1.2 grams, employing three courses with a three-week rest interval. Gennerich differentiated between early cases with negative and with positive Wassermann reactions, using one course of salvarsan combined with mercury in the former, and two courses in the latter. In later cases treatment consists of three courses or more, depending upon the serological findings.

Fordyce recommends giving a course of 5 to 6 injections at intervals of one to two weeks in average doses of 0.4 gram, together with 20 to 30 injections of a soluble salt of mercury at one to two day intervals, or 12 injections of an insoluble salt at weekly intervals. Two such courses are usually given. He emphasizes that the first course is probably the all important one (14).

The treatment recommended for the French Army in 1916 was designed to render the soldier fit to return to his unit as quickly as possible, and plans to complete his cure after his return to duty. To this end eight intravenous injections of neoarsphenamine are administered in increasing doses at intervals of six days, the patient being in a hospital. In addition to this 42 injections of a soluble mercurial salt or 50 inunctions are administered. At the end of this course, which lasts seven weeks, the patient returns to duty, and one month later commences protoiodide of mercury pills by mouth, taking them during the first 10 days of each month for a year (15).

The minimum course prescribed in 1917 by L. W. Harrison at the military hospital, Rochester Row, London, for average early cases of syphilis in the British Army is as follows: Three doses of 0.3 gram of salvarsan on the first, fourth, and eighth day; 0.4 gram on the twenty-second; 0.5 gram on the twenty-ninth, forty-third, and fiftieth days; and eight injections of mercurial cream at weekly intervals. On the fifty-second day a Wassermann test is made, and

if it is not completely negative, potassium iodide is given for two weeks, followed by a course of three weekly injections of salvarsan of 0.3, 0.4, 0.5 gram, respectively, and three injections of mercurial cream. If the blood is still positive, a series of short courses is prescribed similar to the last three injections of the first course. He states that it would probably be better to give a complete course even if the case were negative on the fifty-second day (15).

A system of standard treatment for syphilis was devised by Young for the American Expeditionary Forces, and is a very commendable one. It comprises as a minimum four courses of treatment in a little over one year. The first course consists of eight injections of neoarsphenamine in graded dosage from 0.3 to 0.9 gram. The first three injections are given at four-day intervals and the rest at weekly intervals. A soluble salt (cyanide of mercury) is employed at the start, and then the insoluble gray oil is substituted. The first course is followed by a 30-day rest interval, at the end of which a Wassermann reaction on the blood and a complete serological examination of the spinal fluid is made. Regardless of serological results, a second course, which consists of five weekly injections of neoarsphenamine in graded dosage from 0.45 to 0.9 gram, combined with five injections of gray oil, is instituted. Two more courses are given, regardless of the Wassermann reports, at a 10-week and a 3-month interval. Following the fourth course a four-month rest interval is allowed, and if the blood Wassermann and spinal fluid are then serologically negative, no further treatment is given, but the patient is checked up serologically and clinically at the end of a four or five month rest period (16).

In his book on Syphilis, Hazen advises eight injections of arsphenamine, the first four injections at three to five day intervals and the last four injections at weekly intervals accompanied by a course of mercury. A second course of four arsphenamine injections followed by another course of mercury is given (17).

Habermann and Sinn believe that patients who have passed the negative phase of primary syphilis are best treated by two or three courses of arsphenamine and mercury. A single course, even if the Wassermann reaction becomes negative, is not sufficient, and the patient is not entirely cured, as proven by the occurrence of relapse syndromes. A course consists of from 8 to 10 injections of neoarsphenamine beginning with 0.3 gram and ascending to 0.6 gram at intervals of five to seven days. Mercurial injections are used in combination with the above course. A period of from six to eight weeks constitutes the rest interval (18).

Finger advocates in primary syphilis prior to the Wassermann positive period treatment consisting of 30 inunctions and 5 to 6

moderate doses of salvarsan. Once the Wassermann reaction is positive, even if no secondary symptoms are apparent, the case is considered as one of secondary syphilis, and treatment consists of repeated courses of arsphenamine and mercury at intervals of three or, at the most, four months (19).

Leven protests against the dogmatic statement that cases of seronegative primary syphilis can be aborted by a single course of treatment and cites cases to prove his point (20).

Pollitzer employs a system of treatment based on the principles of intermittent sterilization and prolonged saturation. His course of arsphenamine consists of an intravenous injection of a full dose (0.1 gram for each 25 pounds body weight) of arsphenamine on each of three successive days. His course of combined treatment consists of a course of arsphenamine followed by a four to six week course of mercury by injection. Four courses of combined treatment should be given during the first year after infection, irrespective of the Wassermann reaction, having six and eight weeks' rest interval, respectively, between courses. Further treatment in early cases is called for or not according to the results in the individual case (21). It will be noticed that this system is slightly more prolonged than as originally announced in 1916.

In the early stage before generalization has occurred Ormsby recommends three injections of arsphenamine, given on alternate days. The average dose is 0.4 gram. The first dose is never more than 0.2 gram. Following this course, treatment with mercury either by injection or inunction is given for one month. Six weeks from the last arsphenamine injection three more injections are given. After the second series of arsphenamine injections, mercury is employed for three months, followed by a third series of arsphenamine, and mercury again for three months. In the second year two series of treatment are given in Wassermann negative cases as a prophylactic. In Wassermann positive cases the procedure is as outlined in the first year (22).

The system of treating early syphilis in use by Stokes at the Mayo Clinic, with whom the writer has had the opportunity of being associated as an acting fellow during the past four months, probably covers a longer period of time, with more elaborate checks on the patient's condition, than any of the methods outlined. The results are in the process of compilation. The result in regard to the reversal of the Wassermann reaction is at least as good as any that has been published, and there have been no neuro-recurrences in early cases noted. The system consists essentially of arsphenamine administered in four courses of 8, 6, and 6 injections, respectively, having an initial dosage of 0.3 gram and a final dosage of 0.4 to 0.5

gram, with an interval between the courses which should not exceed six weeks; and mercury administered in three courses of 80 inunctions each during the first year, which are given so as to overlap the arsphenamine administered until the third course is begun. Not less than 300 inunctions of 4 grams of mercury should be given during the entire treatment. If specially indicated, an examination of the cerebrospinal fluid is made at the time of the second and sixth injection of each course, otherwise the examination is made as routine with the second injection only. At the completion of the treatment the patient is directed to return for observation at the end of 42 weeks, after which time he is to return at intervals of from four to six or eight months for four and one-half years, and yearly thereafter for a decade or longer as determined by conditions and circumstances.

CONCLUSIONS.

Over four centuries in the treatment of syphilis with mercury failed to develop any satisfactory standard of treatment. More than 10 years' experience in modern methods of treatment have likewise failed to bring us much nearer this goal. But advances have been made in this direction. At least the use of arsenicals and mercurials in association, with few exceptions, comprise the basis of modern systems of treatment. Time and observation of treated cases only will determine the mode of application, dosage, number of courses, and the length of periods of rest best applicable for cure.

It is recognized that many syphilographers refrain from announcing a system of treatment, realizing that more is necessary than the simple 1-2-3 steps of system in piloting a given case to cure. It requires a thorough knowledge of the disease, a technical and therapeutic knowledge of methods of treatment, and the handling of complications that can not be incorporated in a simple standard of treatment. Yet the writer strongly favors the adoption of some standard of treatment, at least for early cases of syphilis, in the United States Navy. There are several reasons for the adoption of such a standard.

The service would benefit in the establishment of a standard for treatment whereby cases could be checked up and followed through a set course of treatment, barring complications, with less danger to the patient and more promise of cure, than where various standards are followed in the same case.

More satisfaction among our patients would be produced by a standard treatment, and a better spirit of cooperation would be secured if they were not given various treatments according to the special leanings of different medical officers.

Our records would be unified so that statistics could be compiled on a large number of treated and observed cases that would be, in

future years, of the utmost value in determining the value of such a standard and of present methods of treatment.

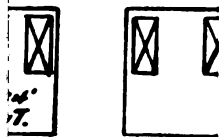
REFERENCES.

- (1) Treatise on Venereal Diseases, by John Hunter, 1786.
- (2) A Practical Treatise on Venereal Disease, by P. H. Ricord, American translation, 1844.
- (3) Syphilis and Marriage, by Alfred Fournier, 1881.
- (4) Pusey, W. A., The Principles and Practice of Dermatology, 1917, pp. 680.
- (5) Schamberg, Kolmer, and Raiziss, Journal of Cutaneous Diseases, 1915, pp. 819.
- (6) Schamberg, Kolmer, and Raiziss, A Comparative Study of the Trypanocidal Activity of Arsphenamin and Neo-Arsphenamin, Am. Jour. Med. Sc., 1920, 160: 25.
- (7) Jacobi, Arch. f. Dermat. u. Syph., 1920, 2: 493.
- (8) Levy-Bing and Gerbay, Medicine, Paris, 1920, 2: 130.
- (9) Neisser, Proc. Int. Med. Congress, 1912.
- (10) Wechselmann, München. med. Wchnschr., 1913, 60: 1309.
- (11) Hoffman, E., Deutsch. med. Wchnschr., 1914, 32.
- (12) Leredde, München. med. Wchnschr., 1914, 61: 1547.
- (13) Gennerich, München. med. Wchnschr., 1914, 61: 513.
- (14) Fordyce, Tr. Am. Phys. and Surg., 1916, 10: 1.
- (15) Harrison, The Treatment of Syphilis, Quart. Jour. Med., 1917.
- (16) Young, H. H., Manual of Military Urology, Amer. Red Cross, 1918.
- (17) Hazen, H. H., Syphilis, a Treatise, 1919, pp. 630.
- (18) Habermann and Sinn, Dermat. Ztschr., 1920, 29: 321.
- (19) Finger, E., Wien. klin. Wchnschr., 1920, 33: 373.
- (20) Leven, Abortive Treatment of Syphilis, Dermat. Wchnschr., 1920, 70: 369.
- (21) Darier and Pollitzer, Text Book of Dermatology, 1920.
- (22) Ormsby, O. S., A Valuable Method of Employing Arsphenamin in Syphilis, Jour. Am. Med. Assn., 1920, 75: 1.

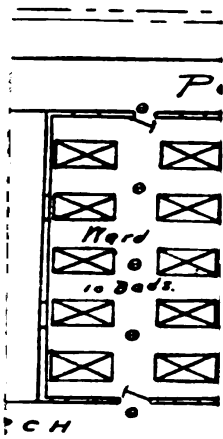
A FIELD HOSPITAL OF THE UNITED STATES MARINE CORPS.

By G. F. COTTLE, Lieutenant Commander, Medical Corps, United States Navy.

The Marine Corps, having grown in size and having been called upon for more extensive operations ashore in the last few years than heretofore, presents to the Medical Department of the Navy a more complicated medical problem each year. What a few years ago was considered a luxury, to-day has become a necessity. The type of recruit is changing, he stays in the Marine Corps a shorter time than of old. His people at home follow his military career with a greater interest; they think more of his comfort; they expect more of the officers who care for and lead him; they expect him to be given medical and surgical treatment fully up to the standard of the best that the medical profession has developed whether the man is serving at home or abroad, at sea or on shore.



Co. 105.



ement N.

Road n

Some years ago the Bureau of Medicine and Surgery prepared a special supply table known as the field supply table, based on the experience gained by medical officers who had served with the United States Marine Corps on expeditionary duty. For a mobile force landed from a fleet with the medical facilities of the various ships of the fleet at hand, and with perhaps a hospital ship as a medical base, the field supply table adequately meets the medical needs of the landing forces.

In the northern district of the Dominican Republic during the period of active military penetration of the forces of the United States Marine Corps and for some time after settling into the present less mobile stage of temporary occupation, the regimental medical and surgical equipment and the field supply table met the requirements of the regimental medical officers. As the status of occupation became more fixed, and especially after the supporting fleet and the hospital ship had retired from the scene of activities, the medical department of the Fourth Regiment of Marines found itself separated from naval hospital facilities by many days of arduous travel over land and sea. Gradually it was found that equipment and buildings and a more liberal allowance of medical supplies would be necessary.

In July, 1919, the necessity for better facilities for caring for the sick was brought to the attention of the Bureau of Medicine and Surgery and to the Major General Commandant of the Marine Corps by the regimental surgeon and the commanding officer of the regiment. The Bureau of Medicine and Surgery liberally met all requests for medical supplies in excess of the allowance on the field supply table, and furnished six portable buildings with which construction of a field hospital might be begun. The Major General Commandant authorized the commanding officer of the regiment to proceed with the construction of a field hospital suited to the needs of the regiment in its then semipermanent status of occupation. Many times it has been necessary for a medical officer serving on expeditionary duty to take over a school, church, stable, hotel, bakeshop, or whatever building happened to be available for remodeling and adaptation to his needs as shelter for patients, his assistants, and equipment. The construction of the Fourth Regiment Field Hospital is a new and possibly a forward step in the endeavor of the Marine Corps to provide a proper up-to-date and adequate environment for its sick and its medical personnel on expeditionary duty. This is the first time that a field hospital has been planned and constructed from the ground up for a regiment of marines, and it is thought that a description of this structure might be of interest to medical officers other than those who have had a share in the planning, construction, equipment, and management of this hospital.

The site selected is convenient for the regiment, which is scattered in small detachments throughout the Northern Department of the Dominican Republic. On the outskirts of the city of Santiago, located on a ridge overlooking the city and the beautiful surrounding hills, valleys, and plains, it is exposed to the unobstructed stream of the prevailing breeze. Its natural drainage is perfect; rain water can not stand anywhere near. Convenient to the camp of the regimental supply company, the carpenter shop, corral, garage, and other units of the quartermaster department and pay office, it is nevertheless sufficiently isolated from them to be a safe place for the care of communicable diseases. The city water supply and electric lights are accessible. A deep ravine back of the immediate site and a wide uninhabited area on three sides provides for a real degree of isolation. One road, and that directly within view of the administration office, permits the entrance of patients to the hospital; a branch road exists for officer patients and another branch for the receipt and delivery of stores.

The general plan of the hospital is adapted to the warm climate; a group of separate buildings, 10 in all, joined together and surrounded by a 6-foot covered porch or veranda. Beneath the buildings an air space is provided by their elevation upon cement blocks. The walls are of tongue and groove lumber, clap-boarded, and painted light gray inside and forest green outside. The floors are of wood everywhere except in the kitchen and mess hall, operating pavilion, and bathhouse, where cement has been used. Excellent natural ventilation and light is provided by windows and openings under the eaves. The wards, galley, mess hall, and operating rooms are well screened against mosquitoes and flies. Tents provide for the segregation and, when necessary, the isolation of contagious cases, and in tents the hospital corpsmen are quartered. Long connecting porches provide shade and a clean place outdoors for convalescent patients, and make it unnecessary to utilize space within the buildings for hallways and passages.

The value of the refreshing and almost continuous breeze, blowing most of the year from one direction, was considered in the design of the hospital, and the buildings were placed in relation to one another, and their interior arrangements so planned as to take advantage of this beneficial factor of the location. The disinfecting influence of the tropical sun was also considered, and yet a proper shade for the sick and their attendants is provided. The plumbing is excellent, modern in every respect, bathrooms, toilets, and sinks being of the best type and well installed, yet the fixtures are much less expensive in type than those furnished in the more permanently constructed naval hospital. Kitchen effluent is led into an adjacent

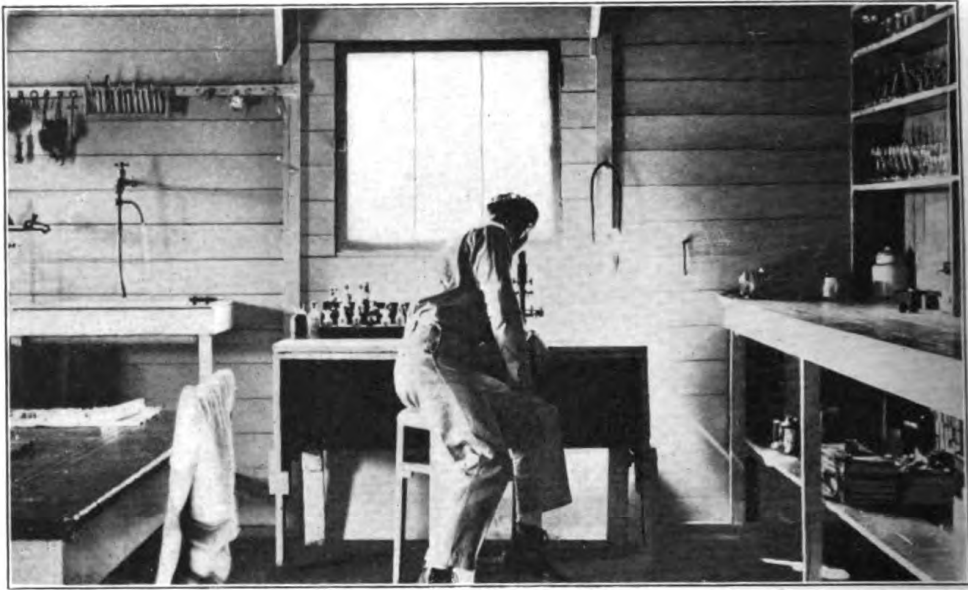


VIEW OF WARDS.



HOSPITAL CORPS QUARTERS

764-1



LABORATORY.

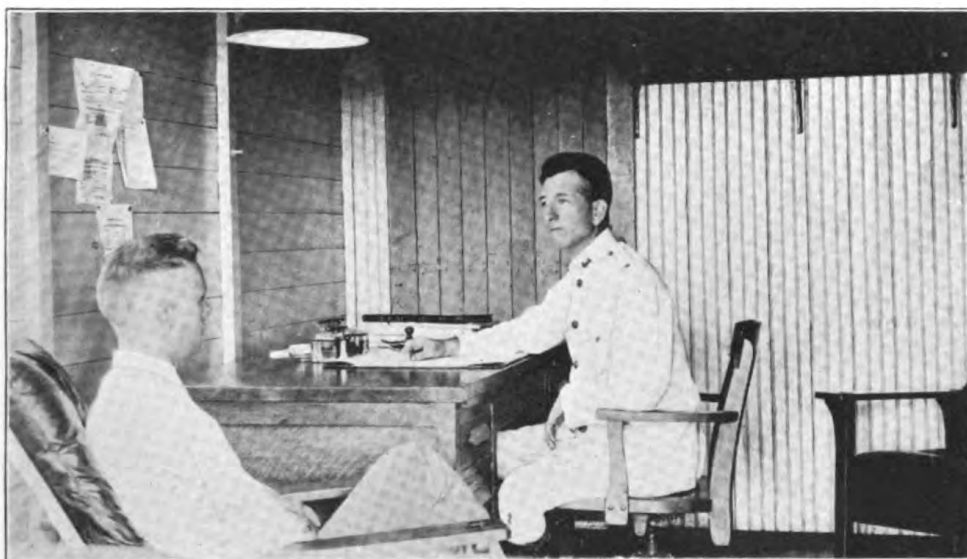


OPERATING ROOM.

764-2



INTERIOR OF WARD.



MEDICAL OFFICER'S OFFICE.

764-3

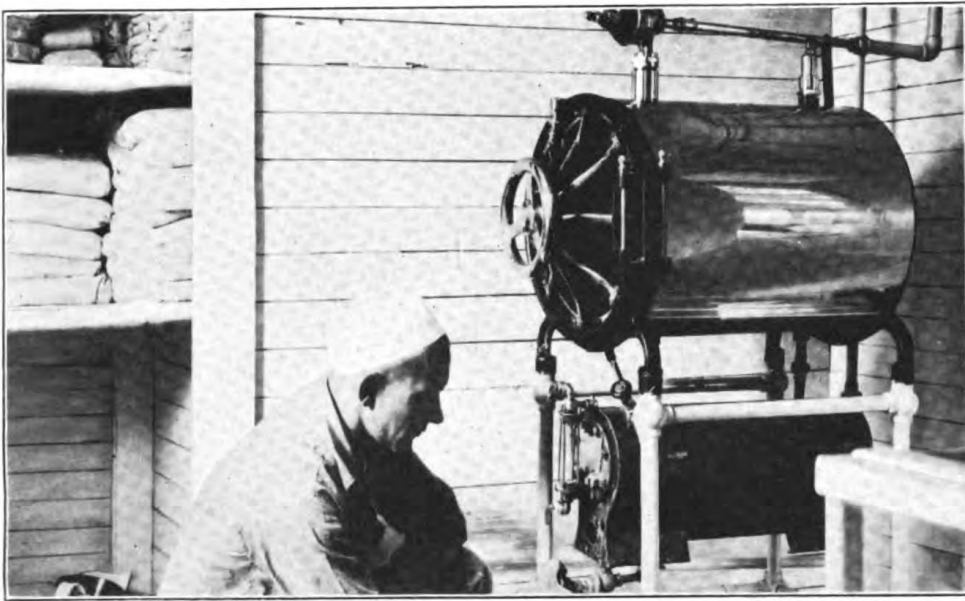


SICK OFFICER'S QUARTERS.



SICK OFFICER'S ROOM.

764-4



STERILIZING ROOM.

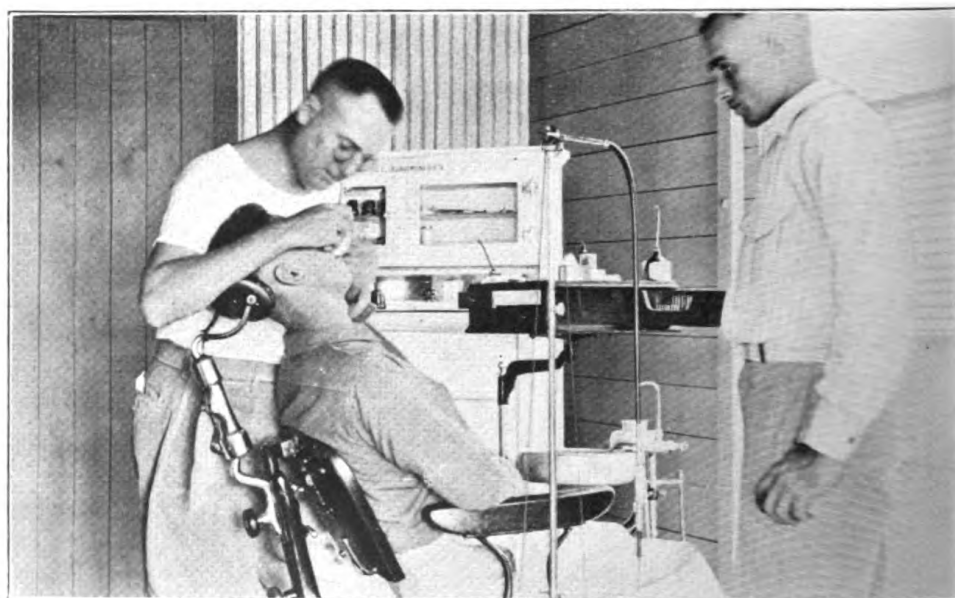


HOSPITAL OFFICE.

764-5



DISPENSARY.



DENTAL OFFICE.

764-6

ravine in an open gutter, where the sun, the rains, and seepage into the soil provide for its ultimate disposal. All other drainage except that for storm water is carried through iron pipes with adequate traps into a closed anerobic, two-chamber, cement septic tank, thence through a sand filter into the open ravine.

The administration office is placed where it has visual control over all persons entering or leaving the hospital. The commissary rooms and the kitchen are cool and well planned, and the cleanliness and comfort of the civil employees have been provided for by a shower bath for them alone. There is an excellent storeroom for commissary and quartermaster stores. Separate lockers for clean linen, dirty linen, closets for stowage of articles in daily use, book shelves, shelving for bottles and other apparatus, and many other conveniences have been built in wherever needed, so that there is a place for everything and orderliness and cleanliness are thereby easily maintained.

The medical storeroom, contiguous to the administration office and dispensary, is large enough to accommodate all the medical supplies listed on Form B in quantity sufficient to meet the requirements of the hospital and the sick bays of isolated detachments. In fact it of necessity acts as a miniature supply depot and must carry in stock an excess because a long time, often months, may elapse between the placing of a requisition and the receipt of the supplies from the United States, due to the distance, infrequency of direct Government transportation between New York and the Dominican Republic, and the other unavoidable delays. The storeroom is so arranged that all supplies are accessible both to sight and hand and arranged in the sequence of Form B for convenience in taking inventory. The dispensary is small and is so arranged as to contain only the equipment used in actual dispensing.

The office of the dental surgeon is small yet sufficient to contain the standard Navy dental equipment properly arranged for operation. A closet, which contains the dental officer's supplies, opens into the office, thus giving him complete control over his own supplies.

The office of the medical officer is next to the laboratory, so that he has the conveniences for accuracy in his diagnostic work right at hand. The laboratory is large, airy, light, and comfortable, well adapted to house the portable laboratory equipment standardized during the war for field work, and on the shelves there is ample room for additional supplies that are kept on hand to fill requests for laboratory supplies when made by the seven outlying sick bays of the regiment, each of which has its own microscope and accessory case. Back of the laboratory is a guinea pig hutch and run. A building shown on the plan, and now about to be constructed, is to house the X-ray apparatus, to provide space for plate developing; space for

an eye, ear, nose, and throat diagnostic and operating room; space for a bag and clothing locker and for a morgue.

The operating pavilion has a room for the treatment of acute venereal cases, a room for "pus" dressings, a surgeon's dressing room, a sterilizing room, and the operating room proper.

The three wards for patients, of 10 beds each, are cool, shaded, yet with sufficient light, and the adjacent porches with the comfortable chairs, reduce the stay of convalescent patients indoors, thereby giving the bed patients the quiet and room they need.

Three Munsen-type hospital tents provide six beds for the segregation of communicable diseases.

Back of the central ward is the building containing baths and toilets, which is ample in size and so constructed as to be easily kept clean and dry.

A recreation room is provided with a pool table and a phonograph, accessible to the convalescent patients or the hospital corpsmen during leisure hours, yet far enough removed from the wards.

The sick officers' quarters, with its four rooms for officers and its own bathroom and toilet, all planned in detail by the commanding officer of the regiment, furnished with every need by the Bureau of Medicine and Surgery and with every luxury and additional comfort by the ladies of the regiment, is a concrete example of the support which a medical officer receives when a real and active interest in the welfare of the sick is taken by the entire regiment.

No laundry and disinfection building has been provided, because the native washerwomen prefer to use the nearby river.

The entire structure has stood the test of nearly a year's use and has proved that the relative proportions of space allotted to the various units are correct. The tables of floor space appended, the ground plan, and the pictures of the building as a whole and of the interior will serve to make the foregoing general description clear.

In the construction and equipment of this field hospital several special aims have been met, among which may be mentioned:

(a) The completeness of the unit because of the detachment from medical bases and because of the military necessity of independence and self-efficiency when on occupied foreign soil.

(b) The semiportability of the entire unit. Slight changes in the method of construction could improve this feature should another such structure for another regiment similarly situated with a similar mission be planned or contemplated, such as porches and partitions, built in sections, the elimination of cement floors, etc.

(c) The ability to rapidly and easily expand to meet the needs of a brigade or of serious extensive epidemic. The normal capacity, 40 beds, could readily be increased to perhaps a total of 300 beds for patients by the addition of tents and medical personnel.

The construction of this hospital has sharply emphasized in the mind of the writer a difference between the Marine Corps and the Navy administrations which must ever be kept in mind by medical officers serving with the Marine Corps on expeditionary duty. In the Navy the environment in which the Bureau of Medicine and Surgery places its medical personnel and supplies is planned in detail by the Bureau of Yards and Docks for naval hospitals and for sick bays in navy yards and naval stations, and by the Bureau of Construction and Repair for hospital ships and for the sick bays of naval vessels. Prior to construction there is cooperation and direct consultation between these bureaus and the Bureau of Medicine and Surgery so that the planning of the architectural features and the permanent fixtures follows, so far as possible, standard designs and benefits by the past experience of these bureaus in planning a proper utilization of space and of the funds allotted. In the Marine Corps on expeditionary duty the Major General Commandant delegates to the commanding officer and the quartermaster of the different units the planning and construction of the temporary and semipermanent structures that are needed by the units.

This difference in method has the advantage of placing the medical officer serving with a marine expeditionary force in direct contact with the constructing and planning officers, but it has the disadvantage of losing for him and for them the supervision and guidance of his own bureau in the formulation of medical plans, for these officers do not of necessity consult the Bureau of Medicine and Surgery prior to construction nor have they any standard plan prepared or approved by the Bureau of Medicine and Surgery which may be consulted or referred to as a guide.

Commanding officers vary in their views of what constitutes a proper environment for the Medical Department; they vary in their ability to formulate such plans in detail, and they vary in their ability to function as architects and builders. Medical officers differ in their experience in planning a proper medical environment for the sick without the guidance of the Bureau of Medicine and Surgery. The result is a lack of standard design in different regiments, a tendency to meet the urgent needs with what may later prove to be inadequate or incomplete construction. Because of these unavoidable differences in ability and experience, it is believed that specifications of materials needed and a standard plan for medical buildings for the use of the Marine Corps, regiment and brigade, on expeditionary duty, should be prepared for the Major General Commandant by the Bureau of Medicine and Surgery in collaboration with architectural designers of the Bureau of Yards and Docks, so that these specifications and plans could be consulted and referred to by commanding officers and medical officers who, together, face the prob-

lems of construction or alteration to meet the medical needs of the marine expeditionary forces.

The degree of success which has attended the planning and construction of the field hospital of the Fourth Regiment must be ascribed to the planning and construction ability of Colonel Dion Williams, United States Marine Corps, who in addition to his other more purely military duties has given a great deal of time and effort to the completion of this project. Another regimental commanding officer, facing a similar problem, should not be obliged to struggle with the same absence of a standard plan and specifications of material needed for construction.

In a consideration of the problems with which the commanding officer of the regiment and his quartermaster were confronted when instructed to build this field hospital it may be of interest to state that while the Bureau of Medicine and Surgery furnished six (20 by 32) portable buildings and three special type sinks (operating room, laboratory, and venereal treatment room), the regiment furnished a great deal more than this to build this hospital.

Among materials furnished by the regiment may be mentioned: Four complete buildings; nine tents and tent flooring; 24,000 feet of lumber for porches, partitions, shelves, counters, etc., and all hardware required for their erection; 450 gallons of paint, green, gray, red, and white; 900 sheets of galvanized-iron roofing $2\frac{1}{2}$ by 8 feet; 320 barrels of cement, with the necessary sand and gravel for 400 cubic yards of cement work in 1,000 square yards of cement walks, 1,872 square feet of cement floor for cement piers, the septic tank, plumbing traps, etc., and for 225 square yards of roadway contiguous to hospital.

It furnished five water flush closets, four square sinks, six hand sinks, one bathtub, and four showers, all with the necessary fittings, and 2,500 feet of electric light wire, with the necessary fixtures, bulbs, switches, etc.

In addition to the material the regiment furnished the architect, the builder, the carpenters, plumbers, masons, electricians, painters, and the road builders, laborers, and all transportation.

TABLE NO. 1.—*Floor areas of buildings and tents.*

	Square feet.
6 wall tents.....	540
3 hospital tents.....	618
6 portable buildings:	
Office, dispensary, and medical storeroom.....	640
Offices and laboratory.....	640
Operating pavillion.....	640
Ward No. 1.....	640
Ward No. 2.....	640
Ward No. 3.....	640

TABLE No. 1.—*Floor areas of buildings and tents*—Continued.

	Square feet.
1 sick officers' quarters.....	800
1 bathhouse.....	324
1 special building.....	700
Miscellaneous:	
Linen locker.....	22
Employees' bath.....	64
Prophylactic head.....	64
Guinea pig hutch.....	24
Porches, covered.....	2,940
Total.....	9,936

TABLE No. 2.—*Floor areas occupied.*

	Number of beds.	Square feet.	Percentage of floor areas occupied, not including porches.
(a) Beds for patients:			
Enlisted men—			
Ward No. 1.....	10	640	7.68
Ward No. 2.....	10	640	7.68
Ward No. 3.....	10	640	7.68
3 isolation tents.....	6	618	7.34
4 officers' rooms.....	4	576	6.84
(b) Beds for hospital corpsmen, 6 wall tents.....	12	540	6.42
(c) Baths and toilets:			
Enlisted men, patients, and hospital corpsmen.....		324	3.85
Officers.....		64	0.76
Civil employees.....		64	0.76
(d) Recreation room.....		233	2.77
(e) Diagnosis and special treatment:			
Operating pavilion.....		640	7.68
Medical, dental, and laboratory.....		640	7.68
X-ray; eye, ear, nose, and throat; morgue.....		504	5.99
(f) Administration.....		240	2.88
(g) Laundry and disinfection.....			
(h) Storerooms.....		915	10.87
Medical and dispensary.....		400	
Linen, clean and dirty.....		22	
Bag and clothing locker.....		196	
Sick officers' closets.....		24	
Commissaries and quartersmasters.....		181	
Mess gear.....		92	
(i) Kitchen, pantry, and mess hall.....		908	10.79
(j) Miscellaneous.....		224	2.66
Vestibule, sick officers' quarters.....		136	
Venereal prophylactic head.....		64	
Guinea pig hutch.....		24	
Total.....		9,549	

It is hoped that the success which nearly a year's use of this field hospital has demonstrated may prove a help in the formulation of standard plans and specifications for the construction of field hos-

pitals of a portable type for the other regiments, and that this article may be of interest to medical officers and that it may serve to emphasize the need for the preparation of specifications and plans, approved by the Bureau of Medicine and Surgery, which shall serve as a standard for the construction of buildings to house the medical department of a regiment or brigade when separation from naval bases and hospital ships becomes necessary.

**TRAINING AND CARE OF THE FOOTBALL SQUAD AT THE UNITED STATES
NAVAL ACADEMY DURING THE SEASON OF 1920.**

By M. H. ROBERTS, Lieutenant, Medical Corps, United States Naval Reserve Force.

Proper care in the training and diet of men on a football squad will go far toward insuring a successful team. In order to accomplish this there must be the fullest cooperation between coaches, trainers, and the medical officer. It is probable that in the majority of cases it is the medical officer rather than the trainer or coach who fails in this very important fundamental accomplishment. He has a tendency to be dogmatic and often fails to recognize that he usually has intelligent persons to deal with who have had a far wider experience in this particular line of work than himself and who very often have valuable suggestions to offer. He should be constantly on the alert for these and gladly accept them.

On the other hand, particularly in the case of the injured, he should not be influenced by enthusiasm or the desire on the part of both patient and coach for a speedy return of the player to the game, but should be guided solely in his treatment by the pathology of the case in hand, never allowing the interest of the player, and therefore of the team, to become secondary to the desires of an enthusiastic and overzealous coach.

In handling a football squad as large as the one at the Naval Academy, it is impossible to give each man the close supervision necessary to obtain the physical perfection desired in each player. However, individual attention can be given to members of the "A" squad, numbering about 50 men.

Each man should be instructed to report at once to the medical officer any injury or feeling of ill health. Particularly should he be taught the evils of constipation and the simple hygienic remedies to combat it.

By close observation of the men on the field and in the dressing room it is possible to ascertain the condition of the players and to guard against overtraining or "staleness." The weight is a valuable index of the physical fitness of man and should be noted at least

three times a week and daily for men about whom there is any suspicion of overtraining. A steady decline in weight for three or four consecutive days during the latter part of the season is evidence of overwork and the necessity for rest. Generally one or two days' leisure is sufficient to restore most men to their former physical and mental fitness.

During the football season of 1920 it was necessary to carry out this treatment for only three men; however, there was noted among the fourth-class men who began training during the latter part of August, six weeks before the other members of the squad, a general slump in energy and activity toward the latter part of the season, which seemed to indicate that the period of vigorous training had been extended beyond proper limits.

A general massage of the entire body for about 10 minutes following practice is of value. It seems to rest the player and keep the muscles in excellent condition. Care should be taken in instructing the rubbers to warn them against too vigorous manipulation, for it must be remembered that the player has already had a strenuous workout and a massage of this character has practically the same physiological effect.

Players who on account of injury are unable to participate in practice, invariably should be instructed to report for massage each day, for only by this means can an injured man be kept in condition.

Long, hot showers following practice is weakening, and the players should be advised strongly against them. They should be instructed to spend the shortest possible time, compatible with cleanliness, under the hot shower and to follow it immediately by a cold shower for one minute.

The matter of diet is an extremely important point in the training of football men, and hence should be given considerable attention. At first glance, in feeding men who participate in such violent and long-continued exercise, the amount of food required seems remarkable. However, when we consider that it is not uncommon during a strenuous practice game for some of the larger men to lose as much as 8 or 10 pounds in weight, and the smaller men proportionately, it is evident that a relatively large quantity of food must be consumed to replace the waste and build up muscle tissue. Of course a large majority of this loss is water, still with the expenditure of so much energy there must be a great loss of stored-up food and tissue.

In arranging the menu at the Naval Academy in 1920 there were no radical departures from those of other years. Sugar was given more abundantly with no evidently deleterious effects. A more varied diet was provided than had been the custom and seemed beneficial. Either figs or prunes were served once daily along with some other

fruit, to which is partly attributed the very low incidence of constipation among the players.

On the football training table there were 88 men. The average daily consumption per man was 6,300 calories, obtained from 240 grams of protein, 300 grams of fat, and 660 grams of carbohydrate.

From observations during the past season it seems that the present arrangement of meals as served on the training table does not meet the requirements of the football squad. The routine heretofore has been to serve the heavy meal at 6.30 p. m., immediately after a hard practice, while at midday a comparatively light lunch is eaten. According to the laws of physiology this is not an ideal schedule. After two or three hours' hard practice a man is often exhausted, and to fill the stomach with a large amount of food is to invite indigestion. On several occasions the men have stated that they felt too tired to eat heartily.

It would seem much more desirable to serve dinner in the middle of the day, at least three hours before practice, except, of course, on the day of a game, when on account of the hour of the play this would be impossible and for other reasons would be undesirable.¹

In consideration of the injuries resulting from football during the season of 1920, it will be of interest to know that the total number of men from which cases were drawn was 300, composing not only "A" and "B" squad men but also those participating in class football.

In the classification and enumeration of these injuries it was found that muscle contusion is by far the most numerous among the injuries treated. Next in number were sprains and contusions of joints followed by fractures, dislocations, and muscle and tendon strains. Cases of chronic synovitis were rare, and there were only two players who suffered from teno-synovitis, in both instances the Achilles tendon being involved.

In the treatment of contusion of muscle the high-frequency current as delivered by a small portable machine was found to be a very valuable adjunct. It has the property of driving heat deep into the bruised muscle tissue which is a distinct advantage over the usual application of either moist or dry heat to the surface of the injured part. In addition to this property there is another very excellent modality furnished by this machine in the employment of the sinusoidal current for the production of complete muscular contraction. This method of producing contraction of the muscle is far superior to the use of the faradic current, in that the resulting contraction is more complete and is not accompanied by the disagreeable sensation

¹ Other authorities have found it more advantageous to serve the heavy meal of the day after exercise. Digestive disturbances did not follow this practice; while with a heavy meal in the middle of the day, the players lacked "pep," and many complained of nausea or actual vomiting after or during the football exercise.—EDITOR.

of an electric shock. This latter practice can not be indorsed too highly, as the favorable results obtained in the treatment of the majority of these injuries is attributed in a large measure to its use.

Not only is the use of this machine excellent in the treatment of a contused muscle, but it is found very efficient in delivering heat to an injured joint, particularly the smaller ones, and was almost invariably employed in the treatment of injuries of this character.

It is generally advised in the early treatment of muscle bruises to employ evaporating lotions and rest only, waiting 24 hours before the application of heat. This method was at first followed; later, however, the immediate employment of heat was tried with excellent results. The patient invariably stated that there was great relief, and it was evident that recovery was hastened.

The following was the routine carried out in the majority of the injuries of this character: For the first 24 hours the man was excused from all formations, drills, and athletics, but was allowed to attend his classes. It was practically never found necessary to put him to bed or even excuse him from classwork. As soon after the injury as possible, heat was applied either by means of the electric baker or steamed towels for a period of one hour, followed by the use of direct diathermy in as many cases as possible. During the first 24 hours, direct diathermy was twice employed for about one hour. On the second day this form of heat was again applied followed in most cases by the use of the sinusoidal current for 10 minutes. This produced complete contraction of the bruised muscle, and thus removed a great deal of the stiffness, increased circulation through the part, and softened the tense, hard muscle. The patient invariably noted great relief, and sometimes the improvement in function was remarkable. Occasionally a muscle was too severely bruised for the application of the sinusoidal current at the end of 24 hours and to these light pétrissage was administered with contraction probably on the following day.

After the contraction in those contusions of moderate severity a slight work out was permitted, possibly signal practice, but no scrimmage. The following day they would be ready for regular practice. However, for the next week or 10 days great care was taken that the injured part was well protected from possible injury; for a severe blow to an old contusion produces a condition much worse and much more resistant to treatment than was the first injury.

There were a few contusions much more resistant to treatment, but they were rare and almost invariably occurred among men who were not under the closest supervision or who were careless in reporting their injuries. They reported usually a week or more after their first injury, with a history of several subsequent blows over the same area. These cases showed plainly that not so much emphasis must

be placed on absolute rest to insure rapid recovery as on protection against further injury, which is absolutely essential. Of course, comparative rest for the first 24 hours is necessary, and occasionally 48 hours is required, but this was found to be rare.

In the treatment of these injuries it is absolutely essential to protect the injured player from the "husky rubber." A great deal of damage can be done to a bruised muscle by a vigorous massage given by the untrained "rubber" generally employed by football teams. The "rubber" should be instructed never to massage an injured player, no matter how slight the injury, until he has consulted the doctor in charge. Likewise the player should be warned against the possibility of this injury by insisting that he report all injuries immediately to the physician or trainer.

Injuries to the joints came next in number to those of the muscles, and those giving the most trouble were the knee, ankle, and acromioclavicular, the former leading the other two by a wide margin, not only in number but in resistance to treatment, and rendering the player useless for long periods of time.

Practically the only treatment of value in sprains and contusions of the knee is rest, daily application of heat as furnished by the electric bakers and the high-frequency current, and finally adhesive straps to support and protect the part. In this condition absolute rest is essential, it often being necessary to keep the patient at rest for a week or more, and occasionally hospital treatment is necessary.

Players giving a history of previous injuries to the knee were required to keep the joint supported and protected by means of adhesive or muslin support.

Sprains of the ankle were few and in most cases of slight severity due to the fact that every player on the squad, regardless of the condition of the ankle, was required to wear a figure-of-eight canvas bandage to support the joint. The player occasionally complained of this support at first, but he soon recognized the value of this preventive measure and never went out without it. This measure can not be emphasized too strongly; undoubtedly it saved many ankles from injury during the football season.

In the early treatment of sprains of the ankle, evaporating lotions were employed with a snug bandage. Absolute rest was necessary in most cases for the first few days. After the first 24 hours, heat was applied by means of the baker and the high-frequency machine; the latter is excellent for delivering heat to the joint. Finally an adhesive strap was applied after all swelling had subsided. The adhesive gave much better support if the vertical straps extended well up on the leg, almost a foot on each side, and were reenforced by a figure-of-eight canvas bandage so applied as to support those liga-

ments which had been strained or torn, which in most cases were the lateral ones.

A sprained ankle can not be protected and cared for too energetically. Usually it requires quite a long period of rest, and great caution must be exercised when the player begins using the injured part. It was found necessary to retain the adhesive straps for several weeks, and always thereafter the ankle must be well supported.

Injuries to the acromio-clavicular joint were frequent and very resistant to treatment, often keeping the man out of play for a week or more and were very prone to recurrence. Heat applied to the joint daily was of benefit. Restriction of the motion of the joint by means of a crossed adhesive strap during the first week gave relief and seemed to hasten recovery. In practically every case heavy padding over the joint was necessary for the remainder of the season, for even slight injury seemed to cause a recurrence of the trouble.

There were only seven fractures sustained by the entire squad during the 1920 season, the most interesting being one of the zygoma. Immediately after the injury there appeared to be a very marked deformity with impaction into the maxilla. However, the man recovered without operation and with very slight deformity. He was playing football again in six weeks and experienced no further trouble.

There was one fracture of the calcaneus, one of the tibia, one of the nasal bone, two of the metacarpals of the right hand and the terminal phalanx of the thumb. Only the first two of these injuries kept the men permanently out of the game.

In the treatment of teno-synovitis of Achilles' tendon rest in bed is absolutely essential. There were two cases of this trouble, and in one of them an attempt was made to keep the man up and about by means of plaster of Paris splints applied to the ankle. However, it was evident, after a day or two, that the condition was not improving, and that absolute rest was necessary. For five days he was kept in bed, during which time hot packs were applied daily to the tendons, and after crepitation had disappeared the parts were massaged. Exercise was begun slowly and by the end of the week the player was able to go through regular practice without discomfort.

GAS POISONING IN WARFARE.

By G. H. MANKIN, Lieutenant, Medical Corps, United States Navy.

The subject of gas warfare is one which is of utmost importance to the Army and naturally, therefore, to the Marine Corps and to

62080—21—5

any landing force of the Navy. Its importance in connection with warfare of a strictly naval character is, more or less, a matter of conjecture. An authentic instance of the use of poison gas as an offensive weapon in naval warfare is lacking. However, there are reports which indicate that such use was made by the Germans during the late war.

It is important that there should be a thorough appreciation of the part that gas has played in land warfare in order to properly estimate the possibilities of its use at sea. This is particularly necessary to combat the tendency toward undue apprehension that frequently attends the introduction of any new and novel method of offense. A proper, orderly, and well-balanced estimate of the applicability, probability of employment and suitability of gas for use in naval warfare can only be given after a careful study of gas warfare on land, the physical and chemical properties of toxic gases, and gas-warfare tactics together with their necessary modification to meet conditions at sea.

It is inconceivable that, in view of the tremendous value of gas as an offensive measure on land, there will be no attempt to apply it to future naval warfare.

It is a well-known fact that the first attack launched by the Germans against the Allies, April 22, 1915, had a tremendous moral effect upon not only those exposed to the cloud but also the rest of the world. That attack was of a low concentration of chlorine released from cylinders, and was not comparable to later attacks except in the effects produced. Improvements in container design and changes in tactics increased the concentration of the gas cloud and therefore its toxicity. Fortunately, defensive measures kept pace with the offense. It is doubtful if a single casualty would result if a regiment equipped with the latest and most modern antigas apparatus were exposed to a chlorine cloud gas attack of the concentration used in the first attack.

The first attack was delivered in the Ypres sector, between Langemarck and Hill 60, at the juncture of the Canadian and French colonial troops then in the line, and came as a complete surprise to the Allies. No protection whatever against this form of warfare had been provided. Those who did not fall back or attempt some simple protective measures, as breathing through water-soaked cloth, became casualties. There is no way of knowing the exact number of casualties, but C. G. Douglas,¹ writing in the *Journal of the Royal Army Medical Corps*, estimates that about 7,000 were affected, of whom 350 died, a mortality of 5 per cent.

¹ Douglas, C. G., *Jour. R. A. M. C.* XXXV, 80, July, 1920.

In the second attack, May, 1915, there were a smaller number of casualties, but a higher percentage of deaths. This may be ascribed to the fact that the concentration of chlorine gas was higher and the time of the attack was longer for the purpose of wearing down whatever protection had been provided. Wherever protection was defective or exhausted, due to long exposure to gas, the resulting casualty was severe.

Between December 19, 1915, and August 8, 1916, the Germans made five cloud or drift gas attacks against the British. They released large amounts of gas in a limited time, so as to attain the highest possible concentration. In addition, they increased the toxicity of the cloud by mixing phosgene with the chlorine. Phosgene (carbonyl chloride) is a lung irritant having, predominantly, the faculty of producing its effects late, and it does not call forth the spasmodic cough when breathed as does chlorine. For this reason, large amounts may be breathed without producing unusual symptoms which would ordinarily serve as a warning.

The casualties suffered from these attacks were as follows: ,

Total British cloud gas casualties-----	4, 207
Total deaths-----	1, 013
Relation of deaths to casualties, per cent-----	24

That there were not a larger number of casualties indicates a high standard of antigas discipline and a well-grounded knowledge of gas defensive measures. The average of 850 gas casualties in each attack can not be considered excessive when one takes into consideration the large number of men exposed.

The bulk of the casualties occurred in the front-line trenches, showing the large part played by the element of surprise. In one of the attacks, four battalions of one of the divisions actually holding the line, suffered 320 gas casualties and of these, 232 occurred at points varying from 50 to 500 yards from the enemy, 185 taking place in the fire trenches.

Of the 1,013 gas deaths occurring in the five attacks mentioned above, 485, or 47.8 per cent, occurred in the trenches; 175, or 17.3 per cent, occurred in the field ambulances; 320, or 31.6 per cent, occurred in casualty clearing stations; and 33, or 3.3 per cent, occurred in hospitals on the line of communications.

It will be noted that nearly one-half of the deaths occurred before the casualties could be admitted to any form of medical unit. Practically all of these casualties occur within the space of a few minutes. It is this fact that throws such a burden upon the medical department. In many of the attacks there was no period of rest following, because there was frequently an infantry attack after the gas had moved on. All of this increased the difficulties attendant upon transportation of the badly gassed.

Many deaths occurred in the early days due to the fact that the apparently lightly gassed were evacuated as ambulatory cases. Muscular exertion will accelerate the onset of pulmonary edema and aggravate the symptoms when edema has been established. It was on this account that very strict orders were issued to the British in France directing that all casualties caused by the lung irritant gases, except the known light ones, should be evacuated as stretcher cases.

The British experience, borne out by that of our own Army, indicates that deaths from chlorine or phosgene poisoning occur usually within 48 hours after exposure and that 80 per cent of them occur within 24 hours. It would seem, therefore, that all efforts should be made to get the patient to a place where intelligent, rational, and efficient treatment could be had in the first 12 hours. Treatment in a first-aid station or casualty clearing station must necessarily be of the most primitive type. However, the British attempted to provide oxygen for inhalations at the clearing stations, and they report very good results from this innovation.

After August, 1916, the Germans began to use the cloud gas attack less frequently, not at all against the British, a few against the French, and quite a number against the Russians. In one engagement two entire Siberian regiments, the Fifty-second and the Fifty-third, were wiped out. The partial abandonment of this form of gas attack may be ascribed to several facts. The gas cloud attacks have several disadvantages. Preparation for one entails a large amount of work, considerable time, immense amounts of material, and if the enemy carries out a successful raid and discovers what is intended, the work of days is lost. The cloud attack is wasteful, it is dangerous to one's own troops, and it is dependent upon the whims of the wind. A wind of too slow a velocity does not provide the necessary element of surprise, while a wind of too high a velocity does not allow the gas to remain over the object long enough to be effective.

To deliver a cloud-gas attack it is important to know the state of the gas preparedness and the gas discipline of the opposing troops. Efficient and effective gas defense can not be gained in a day; it requires long periods of training. The British found themselves, at one time, opposed by a German naval division, which had newly occupied a sector of the line in Flanders. This division was provided with poor respirators, poor system of gas alarms, and they were not trained in gas defense. It was decided to gas them as soon as possible. Accordingly the gas engineers occupied the trenches opposite the naval division. The Germans became suspicious and raided the trenches to get information. They found out what was planned, but could not hold the ground that they had gained. Imme-

diately they began an intensive course of training in gas defense. Although they had a week in which to accomplish this before there was a favorable wind for the attack, it turned out that they were not sufficiently trained, and it is reported that there were about 1,500 casualties out of a total of 6,000 men exposed to the gas, and there was a very high percentage of deaths.

The Germans used the cloud gas attack only where there was reasonable expectation of good results; for example, against poorly trained troops or troops that had only recently arrived on the lines. The American Army received a few attacks of this nature when they first arrived on the firing lines.

Very approximately, the concentration of the gas cloud is inversely proportional to the square of the distance between the two lines. This provides a considerable element of danger to the troops releasing the gas. Nearly always there is some one affected while working around the valves on the cylinders.

Weather conditions are important in all gas warfare, but especially so in the case of cloud gas. If a wind is too strong, the gas is dispersed; if too weak it moves the cloud over toward the enemy so slowly that there is no element of surprise, besides, a low velocity wind is notoriously changeable, and the results are often very disastrous to the attacking party. For example, the Germans attempted to gas a certain sector occupied by the British and the wind was of very low velocity. The gas rolled over the British trenches, the wind shifted and the gas rolled back over the German trenches and the Germans were seen moving many men out of the trenches the next day. Documents show that about 1,100 Germans were gassed through this shift in the wind.

Projector discharges caused results that were similar to those produced by cloud gas attacks. The British were impressed with the fact that the concentration in a gas cloud attack was greatest just in front of the trenches from which the gas is discharged. To obviate this defect, they used gas projectiles which were discharged from Stokes mortars. The amount of gas that could be sent over in this manner was truly remarkable. These mortars were able to deliver about 20 charges a minute.

Soon it became necessary to throw over larger amounts of gas in a very short time and the use of the Livens projector and canisters of gas fulfilled this need. A large number of these projectors were sunk into the ground at an angle of 45° . The range was varied by the size of the charge of black powder that was placed at the bottom. The canisters of drums contained phosgene usually and were exploded by contact fuse and booster charge. The discharge of these drums from the projectors was accomplished simultaneously by electricity, as is customary in blasting.

The concentration in the middle of a gas-projectile cloud may frequently be as much as 1 per cent.

. Sixteen projector attacks were made against the British in the period between December, 1917, and May, 1918, with the following results:

Casualties.....	444
Deaths.....	81
Percentage of deaths.....	18.2

The British realized much better results than this in their use of the projector. In one attack there were 119 gas casualties with 53 deaths, in spite of the fact that the projector emplacement had been discovered and the troops warned.

After the first battle of the Somme, July, 1916, the Germans introduced shells containing such lung-irritant gases as phosgene, di-phosgene and chlorpicrin. The points in favor of the use of gas shells are: (1) accuracy, (2) concentration, (3) surprise, (4) generally speaking, independence of air currents, wind velocity, and temperature.

Between July 15, 1916, and July 12, 1917, the number of casualties caused in the ranks of the British by this form of shell was as follows:

Total gas casualties.....	8,806
Total deaths.....	532
Deaths per hundred casualties.....	6

The Germans introduced two new types of gas shell in the middle of July, 1917, namely, the yellow-cross shell, containing mustard gas, and the blue-cross shell, containing toxic chlorarsine compounds. The latter, unlike most gas shells, had a large amount of high explosive in it. This removed one of the features by which a gas shell might be recognized on explosion. The sound was that of the ordinary high-explosive shell, instead of the "wobbling" sound and small amount of noise on explosion that accompanied the gas shell formerly used. In mistaking this shell for high-explosive shell, it is believed that many men failed to don their masks and thereby became gas casualties.

From the time of the introduction of these two types of shell to the end of the war the British Army suffered the following gas-shell casualties:

Total gas-shell casualties for the period.....	160,526
Total deaths.....	4,086
Deaths per hundred casualties.....	2.5

From these figures it will be noted at once that there was a marked and significant change in the results of gas warfare. The number of casualties is extremely large, but the mortality figure is surprisingly low. The great number of casualties is easily accounted for when

one considers that gas was responsible for 15 per cent, approximately, of the total battle casualties of the British Army for the period given. The change can be attributed almost entirely to the introduction of the mustard-gas shell. This gas alone was responsible for 80 per cent of the gas casualties.

Mustard gas, or dichlorethyl sulphide, possesses two properties which differentiate it from other warfare gases and render it a particularly difficult weapon to protect oneself against. These properties are *persistence* and *insidiousness*.

A single inhalation of the ordinary lung-irritant war gases, such as chlorine, phosgene, and chlorpicrin, causes immediate irritation and institutes a defensive reflex at once. Not so with mustard gas. The action of this poison is not accompanied at first with any painful sensation. The only warning is a faint garlic odor, which is mixed with that of mustard. Nevertheless the gas is causing changes in the skin, eyes, and respiratory tract that will later be attended with severe symptoms. Those who are unfamiliar with this property of mustard gas frequently fall into the error of thinking that the absence of primary irritation indicates a concentration which is too low to be harmful.

The explosion of a yellow-cross shell sprinkles the surrounding area with a heavy liquid that has a low vapor pressure, consequently during a long period following the ground and contaminated objects remain impregnated and dangerous. The liquid soaks into any porous material and continues to give off toxic and blistering vapors. Hence, in the absence of an actual bombardment there is always the possibility that there will be casualties among troops that occupy the shelled area. This has been known to happen as long as two weeks after a bombardment. The gas is more persistent in cold weather than in warm weather, as might be expected.

When one is dealing with the lung-irritant gases one is apt to gauge the effectiveness of the gas by its killing power. It is necessary to regard mustard gas in a different light. Its value lies in its casualty producing power.

On the average the first symptoms appear 6 to 12 hours after exposure, but with high concentration lesions have been observed less than 2 hours after contact. In other reports the time is given as averaging 24 to 36 hours.

The clinical picture of mustard-gas poisoning, in general outline, is about as follows: Several hours after exposure the man complains of nausea, headache, and a feeling of fatigue. There is also noted a smarting of the eyes, a watery discharge, and a swelling of the eyelids. Erythema of the skin appears about the same time as the eye symptoms, usually about the face, chest, buttocks, and between the thighs. As a result of the misinterpretation of this initial

erythema nearly all of the first cases were regarded in the first hours as cases of scarlatina and isolated as such. Intensive blisters may develop, the usual site for these being the back, buttocks, scrotum, and wrists.

Inflammatory manifestations of the respiratory passages begin to appear about the second day after exposure, and are characterized by pharyngitis, laryngitis, tracheitis, and bronchitis. The earliest symptoms referable to the lesions in the air passages are hoarseness, aphonia, and cough. Often the cough is painful and incessant. The outstanding fact in connection with these lesions is the formation of a false membrane lining the trachea and bronchi. This is the result of the direct action of the gas. The patient brings up thick purulent or bloody sputum, fragments of the false membrane, or even a cast of a portion of the trachea or bronchi.

The British, French, and American masks protected against any concentration of mustard gas attained in the field, therefore most of the cases admitted for treatment in the allied forces showed only skin lesions and conjunctivitis. Although these lesions were distressing in the symptoms they produced and kept a man on the sick list for several weeks, rarely, if ever, do they, in the absence of involvement of the respiratory organs, cause death. A fatal outcome is usually the result of the direct action of the gas on the respiratory passages or to a secondary infection in the lungs.

In the American Army there were 71,470 admissions as the result of poison gas; 27,119 were mustard gas cases;¹ 34,046 were admitted as having been affected by "other gases"—that is, not classed under the heading of arsine, chlorine, phosgene, or yperite. It is believed that a large number of cases of mustard-gas poisoning may be found classed under the various headings mentioned above.

Mustard gas caused the loss of 1,286,784 days to the American Expeditionary Forces, as compared with 12,545,442 days lost as the result of all battle injuries. From this it would appear that mustard gas must be placed in the foremost rank as a producer of casualties. The Germans originally placed mustard gas in shells of 77 mm., but later they employed shells of all calibers as gas carriers.

No attempt, in this article, has been made to give a comprehensive review of the status of gas warfare, but rather it has been the purpose of the writer to set forth a few of the salient points in connection with this very important subject in the hope that interest may be stimulated among naval medical officers whose opportunity for varied service is so great, embracing, as it does, activities on land as well as at sea.

A subsequent article will deal more particularly with the medical aspects of this subject, touching upon the symptomatology, path-

¹ Report of Surgeon General, U. S. Army, 1919.

ology, treatment, and prognosis of war gas poisoning, and especially with the late effects produced by these irritants.

VENEREAL PROPHYLAXIS AMONG UNITED STATES MARINES AT HONOLULU, HAWAII, IN 1909-10.

By H. H. LANE, Lieutenant Commander, Medical Corps, United States Navy.

The following notes are from a summary of the venereal situation and records made by me when on duty at Honolulu in 1909 and seem worth publishing, as they show definitely what was being done along the line of prophylaxis by the Navy 12 years ago, long before the subject had excited any special interest or effort in other quarters. It is noteworthy that present results are no better than what was accomplished then in spite of the fact that alcohol undoubtedly played an unfavorable and prominent rôle in the etiology of venereal disease at that time. The conditions existing at Honolulu in 1909 were most favorable for the acquisition of venereal diseases by the enlisted personnel of troops in the vicinity.

With a population of about 47,000, comprising all nationalities and representing every degree of social standing, with a good proportion of the very lowest grades, prostitution with its accompanying evils was a decided menace. As an adjunct to prostitution there were numerous saloons and dives of an even lower character, where fiery concoctions of alcohol and aniline were dispensed at a small price. These so-called liquors were exceedingly potent, and it was doubtless true, as stated by the men, that after imbibing more than a very small quantity they had but a hazy recollection of their actions or whereabouts until they grew sick and feverish several hours later.

There was little or no attempt at control of the social evil by the authorities, the system of segregation and venereal inspection which had previously given satisfactory results having been discontinued early in 1908. The apparent center of the traffic was at Iwilei, a squalid district given over to Japanese, Portuguese, Hawaiians, Russians, and Chinese among the denizens of the hovels which lined the wretched streets.

In January, 1909, a battalion of 420 marines arrived and were quartered in tents on made land near the beach within a 5-minutes' walk from the center of town and about 15 minutes from the Iwilei district. The policy of open-door liberty was in force, that is to say, the men not on duty were allowed daily liberty from 2.30 p. m. to 12.30 a. m.

In the first eight months of their sojourn there reported at the sick bay 54 new cases of gonorrhea, 23 cases of syphilis, and 2 cases of

chancroid with the usual complications, this increasing notably the morbidity statistics of the command, namely, to 1,172 sick days for venereal diseases against a total of 1,950 for all causes. On September 1, 1909, a system of prophylaxis was inaugurated at the medical officer's suggestion. This consisted of first cleansing the parts with soap and water, then washing with a 1 to 2,000 bichloride solution followed by an injection of 3 per cent protargol in a 15 per cent glycerine solution, with a local inunction of 33 per cent calomel ointment.

The moral aspect of venereal diseases and their dangers were impressed on the men and every possible precaution was taken to render the treatment as simple and private as possible. A separate room adjacent to the dispensary was fitted up for the purpose. A hospital apprentice was at hand to give needed instruction and to make a record of the treatment, including nationality of paramour, time and place of exposure, and time of reporting for treatment.

After carefully explaining the benefits of the treatment and the desirability of taking advantage of it, the commanding officer issued an order requiring the men who had exposed themselves to possible infection to take the treatment on returning to camp, under penalty of court-martial. Under this ruling several men were sentenced to lose \$10 pay, the object being to enforce the order without undue punishment. After a few weeks a number of the men became lazy or careless and neglected to take the prophylactic after each coitus, but did take it sufficiently often to prevent the medical officer from definitely proving disobedience of the existing order. A crusade of moral suasion had some slight effect, but the object lesson of a man neglecting treatment and contracting venereal disease from the same source where another who took the prophylactic had gone free had, I believe, a more salutary effect, inasmuch as the number of applications increased in a ratio to correspond with the decrease in the incidence of venereal disease. We had then at the marine barracks a period of 8 months without prophylaxis and of 12 months with prophylaxis, with the appended result which speaks for itself. The average complement was about 400.

I would add that a rigid venereal inspection was made before inaugurating the system, that a careful watch for concealed venereal disease was maintained, and inspections at regular intervals were made to eliminate concealed infections. Reference to Table 1 shows that without treatment an average of $10\frac{1}{4}$ new cases, or nearly $2\frac{1}{2}$ per cent of the command, appeared per month; with prophylactic treatment the average number of cases fell to $4\frac{1}{2}$ new cases per month; a reduction of over 50 per cent.

For eight months without prophylaxis venereal disease caused a loss of 1,172 sick days, an average of $146\frac{1}{2}$ sick days a month. For 12 months of prophylaxis there was a loss of 885 sick days due to

venereal disease, an average of 73½ sick days per month; this likewise showing a reduction of about 50 per cent with prophylaxis. In the 12 months after the order was issued there developed 38 cases of gonorrhea, 16 of whom admittedly did not take treatment. In eight of the remaining cases it is doubtful if the prophylactic was used after the actual infecting exposure, as the incubation in these cases was 12 days or over, but the patients being on record as having received treatment at a previous exposure, it was thought unwise to accuse them of false statements, although we were quite sure that the disease was contracted subsequent to the last treatment record. Of the remaining 14 cases, 7 did not take treatment until 9 to 48 hours after exposure, 4 after a period of 7 hours or over, and 3 within a 3-hour limit. Of the 9 men who developed syphilis, only 2 took the treatment; 1 after an interval of 8½ hours, and the other 9½ hours after exposure. Of the 2 who developed chancroid, both took treatment, one after 12 hours and one 9 hours after exposure. Our results were far from sensational, but a reduction of even 50 per cent in venereal disease was gratifying and certainly worth the slight effort required. The open-door policy of liberty and the nearness of the source of infection increased the difficulty of enforcing the order. The tendency of a few of the men to ignore the order and avoid the punishment by taking the treatment often enough to prevent the medical officer from charging them with disobedience was a serious handicap; but reference to the appended tables (1 and 2) shows a decided lessening of incidence of venereal infection with a corresponding reduction in sick days. The treatment seemed to give best results in reducing the incidence of syphilis, next in gonorrhea, and was least favorable in chancroid. But it is a matter of interest to note that the cases of gonorrhea who took prophylactic treatment ran a milder course, apparently being favorably influenced by the injection.

TABLE I.

EIGHT MONTHS WITHOUT PROPHYLAXIS. ADMISSIONS ONLY.

Venereal diseases contracted in Honolulu, Hawaii.	Gonorrhea and complications.	Syphilis and complications.	Chancroid and complications.	Total sick days.
1909.				
January.....	4	0	1	37
February.....	9	2	1	41
March.....	7	4	0	30
April.....	8	1	0	36
May.....	4	5	2	74
June.....	5	5	0	209
July.....	10	3	0	321
August.....	8	3	1	374
Total.....	55	23	5	1, 172

TABLE 1—Continued.
TWELVE MONTHS WITH PROPHYLAXIS. ADMISSIONS ONLY.

1909.				
September.....	3	0	0	58
October.....	3	1	0	88
November.....	5	1	0	50
December.....	6	3	0	71
1910.				
January.....	4	1	1	145
February.....	4	2	0	168
March.....	2	1	0	85
April.....	0	0	0	0
May.....	3	0	0	36
June.....	1	0	0	62
July.....	5	0	0	72
August.....	2	0	1	82
Total.....	38	9	2	885

NOTE.—Prophylactic treatment adopted September, 1909.

Average venereal infections per month without prophylaxis:

Gonorrhea.....	6.750
Syphilis.....	2.850
Chancroid.....	.625

Total average per cent without prophylaxis..... 10.225

Total average per cent with prophylaxis..... 4.215

Total per cent reduction which may be credited to prophylactic measures.. 4.010

Average venereal infections per month with prophylaxis:

Gonorrhea.....	3.300
Syphilis.....	.750
Chancroid.....	.165

4.215

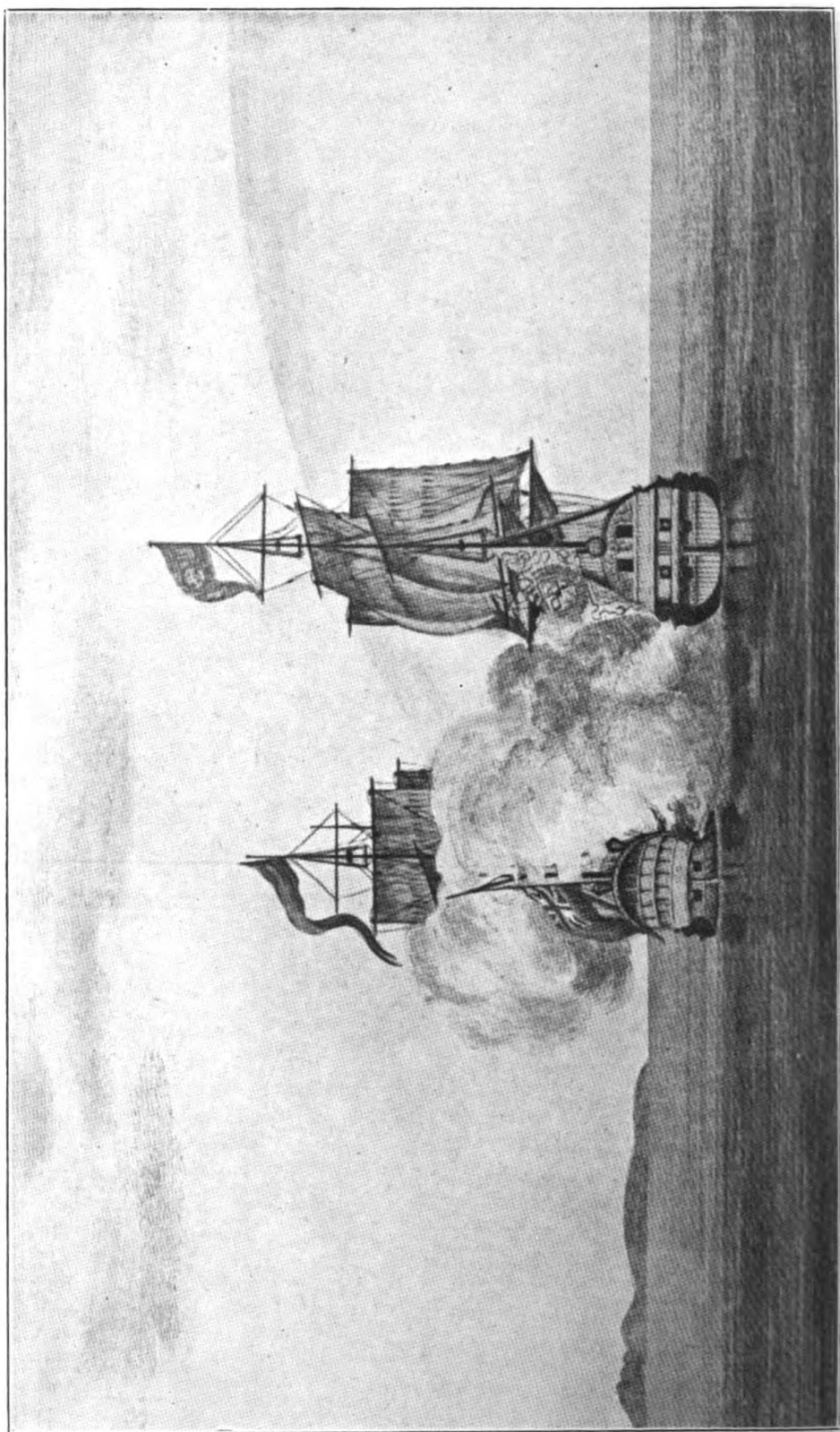
TABLE II.

	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	Total for year.
Reported for prophylactic treatment....	12	34	61	108	117	143	140	143	138	138	168	90	1,292
Uninfected.....	12	34	60	104	112	141	136	143	135	138	164	87	1,266
Infected.....	0	0	1	4	5	2	4	0	3	0	4	3	26

Chancroid, 2. Prophylaxis taken after 12 and 9½ hours, respectively.

Syphilis, 2. Prophylaxis taken after 8½ and 9½ hours, respectively.

Gonorrhea, 22.



THE CAPTURE OF THE MANILA GALLEON.

HISTORICAL.

THE MANILA GALLEON.

Extracted from "A Voyage Around the World in 1740-1744."¹

By W. M. KERR, Lieutenant Commander, Medical Corps, United States Navy.

Toward the end of January, 1742, a little squadron of British ships in command of Commodore George Anson, Royal Navy, approached the western coast of Mexico, then a Spanish colony. England was at war with Spain and these vessels were, in part, the remains of a fleet which on the 18th of September, 1740, had sailed from England on a cruise into the Pacific for the purpose of attacking Spain "in her distant settlements."

The squadron consisted of two British men of war, the *Centurion* "of 60 guns," Anson's flagship; the *Gloucester* "of 50 guns," Captain Matthew Mitchell; and three captured Spanish ships which had been converted into war vessels. They were the *Carmin* "of about 270 tons burthen," the *Carmelo* of like size, and the "*Tryal's Prize*." This latter ship had been captured by the crew of the sloop *Tryal*, which after the engagement was found to be so badly damaged that her destruction was considered advisable. Her captain and crew were transferred to the captive ship and the British ensign hoisted.

The expedition so far had been fairly successful in spite of great adversities. The town of Paita on the coast of Chile had been plundered and burned, many thousands of pounds sterling in silver seized, and several Spanish vessels taken and destroyed. Now, the ships, bent on capturing the richest prize known, were "using all possible dispatch" in getting to the northward of the harbor of Acapulco for the purpose of "intercepting the Manila Galeon." The usual time for the arrival of the galleon at Acapulco had passed, yet the officers of the squadron possessed the sanguine expectation that some accidental delay might have "lengthened out her passage beyond its usual limits," and that she should fall into their hands before she had opportunity of reaching the shelter of the harbor at Acapulco.

On the 26th of January the fleet was standing to the eastward, expecting to make a landfall in the morning, when there happened

¹ In this paper, which is introductory to a short series of articles on the medical aspects of Anson's voyages, the present tense of the verbs, as used by the original writer of the account of this voyage, has been changed to the past in some of the quotations to agree with the tense used in telling the story.

one of those ludicrous occurrences which are the foundation of so many wardroom tales. About 10 o'clock at night the watch on the *Centurion* discovered a light on the port bow. The *Tryal's Prize*, which was about a mile ahead, "made a signal for seeing a sail"; and as none on board the vessels had any doubt but that they saw a ship's light, "they were all extremely animated with a firm persuasion that it was the Manila Galeon." What pleased them most was their "expectation of meeting with two of them instead of one," for each took it for granted that the light they saw "was carried in the top of one ship for a direction to her consort."

The *Centurion* pressed forward with all her canvas, "making a signal for the *Gloucester* to do the same." Thus they "chased the light, keeping all hands at their respective quarters under an expectation of engaging in the next half hour," as they "sometimes conceived the chase to be about a mile distant, and at other times to be within reach of the guns; and some on board positively averred that besides the light they could plainly discern her sails." Anson himself was so fully persuaded that the squadron soon would be alongside of the enemy ships that he sent for his "first Lieutenant, who commanded between decks, and directed him to see all the great guns loaded with two round-shot for the first broadside, and after that with one round-shot and one grape," strictly charging him not to fire a gun until the *Centurion* had arrived within pistolshot of the enemy.

So with guns loaded and the men stripped for action, they continued the pursuit all night, "always presuming that another quarter of an hour would bring them up with this Manila ship, whose wealth with that of her supposed consort" was "estimated by round millions." But when morning broke and daylight came they were "most strangely and vexatiously disappointed, by finding that the light which had occasioned all this bustle and expectancy was only a fire on the shore upon a very high mountain."

At sunrise, "after this mortifying delusion," they found themselves "about nine leagues off the land," in line with two regularly formed hummocks, which the nautical writers of those days usually called "paps." A captured Spanish pilot and two Indians, who were the only persons on board claiming to be familiar with this part of the world, declared them to be over the harbor of Acapulco; but Anson doubted the pilot's knowledge of the coast, for he "found those paps to be in the latitude of $17^{\circ} 56'$, whereas those over Acapulco were said to be in 17° only." He afterwards determined his suspicions of the pilot's skill to be well founded, but at this time both the Spaniard and the Indians appeared to be very confident and assured the commodore that "the height of the mountains was itself an infallible mark of the harbour."

Now that the squadron was in the track of the Manila galleon it was necessary to ascertain "whether she was or was not arrived." The prisoners assured the commodore "that she was sometimes known to come in after the middle of February," and they endeavored to convince him "that the fire seen on the shore was a proof that she was as yet at sea," it being customary, as they said, to make use of these fires "as signals for her direction when she continued longer out than ordinary." Influenced by this argument, Anson determined to cruise off the coast with the expectation of intercepting the galleon. Accordingly he maneuvered his ships "at a distance of 12 leagues from the coast in such a manner that it was impossible she should pass unobserved." However, not seeing her sails on the sparkling waters of the Pacific to the westward of the *Centurion*, Anson was "at intervals inclined to suspect that she had gained her port already," so he determined to send an expedition "under colour of the night" into the harbor of Acapulco to see if the Manila ship was there. A barge was dispatched on the 6th of February in charge of two officers, who took with them the Spanish pilot and an Indian who had offered to guide the expedition.

The barge returned in five days with the discomfiting information that "there was nothing like a harbour in the place where the Spanish pilot had asserted Acapulco to lie." The two officers had sailed along the shore to the eastward for a distance of "thirty-two leagues," and saw only "sandy beaches of a great length;" yet at a very great distance to the eastward they discerned two paps which from their appearance and latitude they concluded must be the hills in the neighborhood of Acapulco, but not having sufficient fresh water and provisions to make further explorations they were obliged to return to the squadron.

On this information the ships made sail to the eastward in order to get into the vicinity of Acapulco. On the following day, which was the 12th of February, the ships "being by that time considerably advanced," the barge was again dispatched, and particular instructions given to the officers "to preserve themselves from being seen from the shore." On the 13th Anson spied a height of land to the eastward which he first imagined to be that over the harbor of Acapulco, but it proved to be the hills behind Sihuatanejo, where there is a small and beautiful harbor with placid waters and sandy beaches shaded by wide-spreading trees.

After waiting some days for the return of the barge, Anson began to be uneasy for her safety; but on the 19th of February she returned. The two officers had discovered the harbor of Acapulco which lay about 50 leagues east-southeast from the squadron. Two days before their return to the ship they had "got within the island that lies at the mouth of the harbour" and yet neither the Spanish

pilot nor the Indian who were with them recognized the place. While they were "lying upon their oars in suspense what to do, being ignorant that they were then at the very place they sought for, they discerned a small light upon the surface of the water, on which they instantly plied their paddles, and moving as silently as possible towards it, they found it to be in a fishing canoe, which they surprised with three Negroes that belonged to it." The officers took the Negroes into the barge and "immediately turned the canoe adrift against the face of a rock, where it would inevitably be dashed to pieces by the fury of the sea: this they did to deceive those who perhaps might be sent from the town to search after the canoe; for upon seeing several pieces of a wreck, they would immediately conclude that the people on board her had been drowned," and would have no suspicion of their having fallen into an enemy's hands. When they had taken this precaution, the crew of the barge "exerted their utmost strength" in pulling out to sea, and by dawn had gained "such an offing as rendered it impossible for them to be seen from the coast."

Anson learned from the three captive Negroes that the galleon had arrived at Acapulco on the 9th of January, that she had delivered her cargo, was taking on water and provisions for her return voyage, and that the Viceroy of Mexico had by proclamation fixed her departure from Acapulco for the 3d of March. This last news was most joyfully received by the officers of the squadron, as they now had no doubt of capturing her. What pleased them most was that she would have on board "the species for which she had sold her cargo" which was "prodigiously more to be esteemed than the cargo itself," a great part of which would have perished on their hands and could not have been sold at a better market than Acapulco.

Thus for a second time they were eagerly expecting to meet this Manila ship, which "by the fame of its wealth" they "had been taught to consider as the most desirable prize that was to be met with in any part of the globe."

As all their future movements were in some way regulated with a view to the possession of this celebrated galleon, and as the commerce which was carried on by means of these vessels between the city of Manila and the port of Acapulco was perhaps the most valuable, in proportion to its quantity, of any in the known world, let us leave the squadron on guard before the green-clad hills of Acapulco and consider for a moment the particulars of the famous trade which existed for years between Manila and Acapulco.

Frederick Magellan, a Portuguese in the employ of the King of Spain, discovered the Philippine Islands in 1521 and claimed them for the Spanish Crown. These islands "were not far distant from those places which produced spices, and were well situated for the

Chinese trade and for the commerce of other parts of India." So a trade was soon established between the Philippines and the Spanish colonies on the coast of Peru, and Manila became "the mart for all Indian commodities."

In its infancy this trade was carried on between the port of Callao and the city of Manila. On the long voyage across the Pacific the trading galleons were favored by the trade winds, so that the voyage was often completed "in little more than two months." But the return of the vessels from Manila was "extremely troublesome and tedious." The first voyages are said to have taken "above a twelve month," because the early navigators attempted to sail due east against the trades. A route to the northward, clear of the trade winds, was soon discovered, and then by the favor of the westerly winds, which generally prevail in high latitudes, the vessels could "stretch away for the coast of California."

At the time our story opens this route had been followed for at least 160 years, Sir Thomas Cavendish, in the year 1586, having engaged off the south end of California a Spanish vessel bound from Manila to the American coast. It must have been soon after the new route began to be used that the Manila trade was removed from Callao to the port of Acapulco on the coast of Mexico to shorten the voyages of the galleons.

One or two ships were employed in the trade between Manila and Acapulco annually. The Manila galleon, as it was called, set sail from Manila about July and arrived at Acapulco in "the December, January, or February following." Having disposed of the cargo, the return voyage to Manila was begun some time in March and completed in June. The whole voyage required very nearly an entire year. "For this reason, though there was often no more than one ship employed at a time, yet there was always one ready for the sea when the other arrived; and therefore the commerce at Manila was provided with three or four stout ships, that, in case of any accident, the trade might not be suspended."

The largest of these ships in 1742 was described as little less in size than one of the British first-rate men of war of that period. She must have been of enormous size, for it is known that once when she was employed with other ships from Manila to prey upon the British China trade, she had no less than 1,200 men on board. The other Manila ships, though far inferior in bulk to this one, were "yet stout large vessels of the burthen of twelve hundred tun and upward, and usually carried from three hundred and fifty to six hundred hands, passengers included, with fifty odd guns."

As these galleons were all the property of the King of Spain, "commissioned and paid by him," one of the captains, "stiled the

General," was in command of the entire fleet. He carried the royal standard of Spain at the main topgallant masthead, "as we shall more particularly observe hereafter."

The Church of Rome was strangely implicated in this trade, according to Richard Walter, M. A., chaplain of His Majesty's ship *Centurion*, who has left us the account of Anson's voyage. He tells us that "this trade to Acapulco was not laid open to all the inhabitants of Manila, but was confined by very particular regulations. * * * The ships employed therein were found by the King of Spain, who paid the officers and crew; and the tunnage was divided into a certain number of *bales*, all of the same size. These were distributed amongst the convents at Manila, but principally to the Jesuits, as a donation for the support of their missions for the propagation of the Catholick Faith; and these convents had a right to embark such quantity of goods on board the Manila ship, as the tunnage of their *bales* amounted to; or if they chuse not to be concerned in trade themselves, they had the power of selling this privilege to others."

The Manila ship having "received her cargoe on board, and being fitted for sea, generally weighed from the mole of Cabite" the port of Manila, about the middle of July, taking advantage of the westerly monsoon to carry her to sea. It appears that the passage through the waters to the south of the island of Luzon was a troublesome bit of navigation and it was sometimes toward the end of August before the vessel passed through San Benardino Strait and got clear of the land. When well out to sea the ship stood "to the northward of the east, in order to get into the latitude of 30 odd degrees," where the captain expected to meet with westerly winds, before which he "ran away for the coast of California."

As this voyage was rarely of less than six months' duration and the ship was "deep laden with merchandise and people," one might wonder how sufficient fresh water was carried for so long a time. "and indeed" says Walter, "their method of procuring it was extremely singular and deserves a very particular recital."

"It is well known to those who were acquainted with the Spanish customs in the South-Seas, that their water was preserved on ship-board not in casks but in earthen jars, which in some sort resembled the large oil jars often seen in Europe. When the Manila ship first put to sea, they took on board a much greater quantity of water than could be stowed between decks, and the jars which contain it were hung all about the shrouds and stays, so as to exhibit at a distance a very odd appearance. And though it was one convenience of their jars that they were much more manageable than casks, and liable to no leakage, unless they were broken, yet it is sufficiently obvious, that

a six, or even a three months store of water could never be stowed in a ship so loaded, by any management whatever; and therefore without some other supply, this navigation could not have been performed. A supply indeed they had, but the reliance upon it seems at first sight so extremely precarious, that it is wonderful such numbers should have risked the perishing by the most dreadful of all deaths, on the expectation of so casual a circumstance. In short, their only method of recruiting their water was by the rains, which they meet with between the latitudes of 30° and 40° North, and which they were always prepared to catch. For this purpose they took to sea with them a great number of mats, which they placed slopingly against the gunwale, whenever the rain descended; these mats extended from one end of the ship to the other, and their lower edges rested on a large split bamboe, so that all the water which fell on the mats drained into the bamboe, and by this, as a trough, was conveyed into a jar; and this method of supplying their water, however accidental and extraordinary it may at first appear, was never known to fail them, so that it was common for them, when their voyage was a little longer than usual, to fill their water jars several times over."

The Manila ships experienced "other inconveniences generally attendant upon a long continuance at sea." The principal of these was scurvy, "which sometimes raged with extreme violence, and destroyed great numbers of the people"; but often the passage to and from Acapulco was made with little loss.

The length of time employed in the voyage, so much beyond what usually occurred in any other navigation of that period, might be imputed in part to the "indolence and unskilfulness of the Spanish sailors and to an unnecessary degree of caution and concern for so rich a vessel." On these ships the mainsail was never set at night, and when the breezes were excessively brisk they often lay by unnecessarily. "Indeed the instructions given to their captains seem to have been drawn up by such as were more apprehensive of too strong a gale, though favorable, than of the inconveniences and mortality attending a lingering and tedious voyage; for the captain was particularly ordered to make his passage in the latitude of 30 degrees if possible, and to be extremely careful to stand no farther to the northward than was absolutely necessary for the getting of a westerly wind." This rightly appeared to the Chaplain Walter as a very absurd restriction, for it was known to the British navigators of that period that in the higher latitudes the westerly winds were much steadier and brisker than in the latitude of 30° , and more speed could have been attained.

The Manila ship having "stood so far to the northward as to meet with a westerly wind," ran along in the same latitude for the coast of California until "a plant floating on the sea" was encountered.

The voyagers placed so much reliance upon finding the kelp which grows in vast beds along the shores of California that "on the first discovery of the plant the whole ships company chaunted a solemn *Te Deum*, esteeming the difficulties and hazards of their passage to be at an end." The ship was now turned southward "without endeavoring to fall in with the coast, till they had run into a lower latitude," thus avoiding the islands and shoals which lie off the coast of California.

After some days sailing the navigators ventured to approach the barren coast of Lower California "for the sake of making Cape San Lucas" and to "receive intelligence from the Indian inhabitants, whether or no there were any enemies on the coast."

At the time of which we are writing Spanish missionaries had established a station near Cape San Lucas, from which a few years later the good Franciscan fathers journeyed northward to build the early Californian missions whose ruins we may see to-day at intervals along the coast from San Diego to Solano.

From the grapes grown in the mission gardens at Cape San Lucas a wine was made which was highly esteemed in Mexico, and no doubt orange and lemon trees shaded the garden paths and contributed to the little store of refreshments which were prepared on the arrival of the Manila ship. It is not surprising that the mission fathers should be interested in the safety of the Manila galleon in which the convents in the Philippines were so deeply concerned, and that they should have instructed the Indians of the mission to be on the lookout for any enemy ship which might have been cruising to intercept her.

So it became the custom, when the galleon sighted the land to the north of Cape San Lucas for the captain to be on the watch for the signal fires of the missionaries. After communicating with the shore and receiving the store of wine, fresh fruits, and water "if, from the account which was sent him, he had nothing to fear," he would proceed to Cape Corrientes in Mexico, from which he would "coast it along to Acapulco."

The usual time for the arrival of the galleon at Acapulco was toward the middle of January. But the circumstances attending the voyage were so uncertain that she sometimes reached port a month sooner and at other times was delayed long at sea. The port of Acapulco in those days was much the finest and most secure of any in the Pacific, but the town was a wretched place, even as it is to-day. The place was destitute of fresh water and was in all respects so inconvenient that except when the Manila galleon was in port, it was almost deserted.

When the galleon arrived her cargo was unloaded with all possible haste. The town was crowded with traders from all parts of Mexico who bought the goods, making payment in silver. When

the cargo had been disposed of, the silver, merchandise, and passengers intended for Manila, were taken on board, together with provisions and water and the ship was prepared for sea. No time was wasted, for the King's orders required the captain to take the vessel out of the port of Acapulco on his return voyage, before the 1st day of April.

The galleon being thus fitted for her return, the captain on leaving the port of Acapulco, steered for the latitude of 13° or 14° , and ran on that parallel, "till he got sight of the island of Guam." In order that he would not run past Guam in the night, all through the month of June, fires were lighted every night on the highest point of Guam and the neighboring island Rota and "kept in till morning."

At Guam there was a small Spanish garrison "purposely intended to secure that place for the refreshment of the galleon, and to yield her all the assistance in their power." However, the danger of the roadstead at Guam was so great, that though the galleon was ordered to call there, yet she rarely remained more than a day or two, but getting her water and refreshments on board as soon as possible, she stood away directly for Cape Espiritu Santo, on the island of Samar.

There the captain was again on the lookout for signals indicating the presence of enemy ships. But if there was no danger he would "pursue his course without interruption and make the best of his way to the port of Cabite."

Now, let us return to Anson's squadron, which we left cruising off Acapulco, waiting for the 3d of March, the date fixed by the Viceroy of Mexico for the departure of the Manila ship. The Commodore learned from the three captive negroes that news had been received at Acapulco of the plundering and burning of the town of Paita on the coast of Chile, and that the governor of Acapulco, thinking that the British squadron might attack Acapulco, had strengthened the fortifications and had placed a watch "on the island which lies at the harbour's mouth." This guard, fortunately for the barge, had been removed but two nights before the vessel had ventured into the harbor; otherwise the expedition might have been doomed to failure. The fact that this guard had been withdrawn convinced Anson that his ships had not been observed from the coast and that the governor had no further apprehension of the English attacking the town; so he determined to cruise to the westward of Acapulco, conceiving that in this situation there would be less danger of his being seen from the shore, which was the only circumstance that could deprive him of the immense treasure.

On the 1st of March, the squadron approached nearer to the shore, so that the highlands behind Acapulco were "fifteen leagues distant." Anson arranged his ships in a vast crescentic formation so that "nothing could pass undiscovered." To prevent the galleon escap-

ing in the night, "the two cutters belonging to the *Centurion* and the *Gloucester* were both sent in shore and were ordered to lie all day at the distance of 4 or 5 leagues from the entrance of the port, where, by reason of their smallness, they could not possibly be discovered." In the night they were to approach the harbor's mouth, and "as the light of day came on they were to return back again to their day posts."

On board the ships great preparations were made for the expected engagement. Ammunition was overhauled and gun crews were exercised throughout the long, hot, tropic days. On the 3d of March we can imagine every disengaged member of the crew eagerly gazing across the blue waters toward Acapulco, some perhaps, constantly imagining that they could see one of the cutters returning with the news that the galleon was standing out of the harbor. But that day and "the succeeding night" passed without any word of her.

However, the crew did not yet despair of the encounter with the Manila ship. Many rumors were circulated around the decks to account for the nonappearance of the galleon. Day after day passed and with each sunset a little of their eagerness abated. By the middle of the month "general dejection and despondency" was everywhere. It is true there were some who still kept their spirits up and were "very ingenious in finding out reasons to satisfy themselves that the disappointment had only been occasioned by a casual delay of the galleon, which a few days would remove, and not a total suspension of her departure for the whole season." But the crew were convinced that the enemy had, by some accident, discovered the squadron and had therefore "laid an embargo on the galleon till the next year." And that is just what had happened. The barge which had discovered the harbor and had captured the three negro fishermen had been seen from the shore and that was sufficient proof of the presence of the British squadron to stop the departure of the galleon.

When it became apparent that the Manila ship was not to sail, Anson considered a night attack on the town, but this plan was given up because the prevailing winds did not favor his entrance into the harbor under cover of darkness.

The supply of fresh water in the squadron was now "found to be very slender," so Anson sailed up the coast to the harbor of Sihuatanejo often interrupted in his progress "by calms and adverse currents." On the 7th of April, "after a four months continuance at sea * * * and having but six days water on board" the squadron came to anchor.

A month was spent in this delightful harbor, repairing the rigging, replenishing the water supply, fishing, and removing the stores from the Spanish ships to the *Centurion* and the *Gloucester*, preparatory to a voyage across the Pacific. As the commodore expected

to encounter tempestuous weather on the coast of China, and as the two British ships were short-handed, he determined to reinforce the crews of the two warships by the men on the Spanish vessels, and, after stripping these ships of all useful gear, to scuttle them. This was done on the 27th of April, and soon after the *Centurion* and the *Gloucester* weighed anchor, hoisted sail, and started their long voyage across the Pacific.

Toward the end of July the ships had reached the vicinity of the Ladrone Islands. The *Gloucester* having become unseaworthy, her people and such stores and prize money as could be saved were taken over to the *Centurion* and she was set on fire. The *Centurion*, the last of the vessels which had left England, continued on her westward course and on the 27th of August sighted the islands of Saipan and Tinian. Anson found Tinian an excellent place for the refreshment of his crew, the recuperation of the sick, and the replenishment of his provisions and water. He remained at this island until the 21st of October, when he departed, steering a course for Macao, where the ship came to anchor on the 12th of November. At Macao, after many vexatious delays, the *Centurion* was completely overhauled and provisioned and on the 19th of April 1743, "at three in the afternoon of that day, weighed and made sail and stood to sea."

Anson had let it be known at Macao that he was bound for Batavia on the island of Java, and thence to England. "But his real design was of a very different nature." He believed that as he had prevented one Manila ship from leaving Acapulco the preceding season, there would be two of these vessels bound to Manila that year. He therefore resolved to cruise for them off Cape Espiritu Santo, on the island of Samar, which was the galleon's first landfall in the Philippine Islands.

He knew the galleons "to be stout vessels mounting forty-four guns apiece, and carrying about five hundred hands, and might be expected to return in company." The *Centurion* had but 227 hands on board "of which nearly thirty were boys." This disproportion of strength did not deter the gallant commodore. He knew his ship was better fitted for a sea encounter than the Spanish vessels, and he had a good reason to expect that his crew would "exert themselves in the most extraordinary manner, when they had in view the immense wealth of these Manila galleons."

When Anson was well out at sea, "he summoned all his people on the quarter deck and informed them of his resolution to cruise for the two Manila ships of whose wealth they were not ignorant. He told them he should chuse a station, where he could not fail of meeting with them; and though they were stout ships, and full

manned, yet, if his own people behaved with their accustomed spirit, he was certain he should prove too hard for them both, and that one of them at least could not fail of becoming his prize: He further added, that many ridiculous tales had been propagated about the strength of the sides of these ships, and their being impenetrable to cannon-shot; that these fictions had been principally invented to palliate the cowardice of those who had formerly engaged them; but he hoped there were none of those present weak enough to give credit to so absurd a story: For his own part, he did assure them upon his word, that, whenever he met with them, he would fight them so near, that they should find, his bullets, instead of being stopped by one of their sides, should go through them both."

This speech was answered by three rousing cheers and "all declared their determination to succeed or perish whenever the opportunity presented itself."

Now all their hopes which had subsided since leaving the coast of Mexico were revived, each man believing that he should yet be repaid for his hardships and fatigue and should at last return to England "enriched with the spoils of the enemy." Firmly "relying in the assurances of the Commodore that they should certainly meet these vessels," not a man doubted that they would be captured: many considered "themselves as having them already in their possession." This confidence was so universal throughout the whole ship's company "that the Commodore having taken some Chinese sheep to sea with him for his own provision, and one day enquiring of his Butcher, why, for some time past, he had seen no mutton at his table, asking him if all the sheep were killed, the Butcher very seriously replied, that there were indeed two sheep left, but that if his Honour would give him leave, he proposed to keep those for the entertainment of the General of the galleons."

The *Centurion* arrived off Cape Espiritu Santo on the 20th of May, 1743. As Spanish sentinels were posted on this cape to signal the ship from Acapulco, when she was sighted, Anson ordered the topgallant sails to be taken in to prevent the *Centurion* being discovered, and began his wait for the appearance of the galleon. There was the "utmost impatience" among the crew in spite of the excitement of preparing the vessel for the fight.

As the days passed the "expectancy increased." The treasure of the galleons engrossed their imagination completely at first, and we can easily picture to ourselves the disappointment of these sailormen when the certainty of the arrival of the Spanish ships "dwindled down to probability only, and that probability became each hour more and more doubtful."

However, on the 20th of June, just a month after the *Centurion* had arrived off Cape Espiritu Santo, they were relieved from "this

state of uncertainty." At sunrise a sail was discovered from the masthead. On this "joy spread through the whole ship, for there was no doubt but this was one of the galleons, and the other would soon appear."

Anson stood toward the sail and by half after 7 was near enough to see the stranger from the *Centurion's* decks. She proved to be the expected vessel. The galleon fired a gun, and took in her topgallant sails, "which were supposed to be a signal to her consort, to hasten her up; and therefore the *Centurion* fired a gun to leeward, to amuse her."

The galleon did not change her course but continued to bear down upon the British vessel; for, as it was afterwards learned, the Spanish commander knew her to be the *Centurion*, and had resolved to fight.

About noon Anson had brought his vessel to within a league of the galleon which could not now escape. No second ship appearing, he concluded that the Spanish vessel had been separated from her consort. Soon after noon "the galleon haled up her fore-sail, and brought to under top-sails, with her head to the northward, hoisting Spanish colours, and having the standard of Spain flying at the top-gallant mast-head."

On board the *Centurion* everything had been prepared for an engagement. Anson "picked out about thirty of his choicest hands and best marksmen, whome he distributed into his tops, and who full answered his expectations, by the signal services they performed." He had not men enough to station "a sufficient number to each great gun, in the customary manner;" therefore, on the lower tier he placed only two men at each gun who were to load it. The rest of his gunners were divided into gangs of 10 or 12 men each who were to move about the decks, run out, and fire such guns as were loaded. In this way he was able to use all his guns, and instead of firing "broad-sides with intervals between them," he was able to keep up a constant fire which was a distinct advantage, inasmuch as the Spaniards were accustomed to lie prone upon the decks when in battle they saw a broadside being prepared and to remain in that position until it had been fired and the danger was over. By firing gun by gun, Anson determined to render this practice ineffective.

Toward 1 o'clock the *Centurion*, being within gunshot of the enemy, hoisted her broad pennant and colors, and, as the Spaniards were seen making preparations for battle with some confusion, Anson opened fire and the engagement began in earnest. During the first half hour of the fight Anson "over-reached the galleon, and lay on her bow," where, because of the wideness of the *Centurion's* ports, her guns could sweep the enemy's deck. Only a few guns had been fired when

the mats with which the Spaniards had stuffed the netting of the galleon took fire and "burned-violently, blazing up half as high as the mizen-top."

This conflagration which had been started by burning wads from the *Centurion's* guns threw the Spaniards into great confusion, and indeed alarmed Anson "for he feared least the galleon should be burnt," and the prize lost. But the sailors on the galleon at last "freed themselves of the fire, by cutting away the netting, and tumbling the whole mass, which was in flames, into the sea."

The *Centurion* kept her advantageous position. The gunners fired "with great regularity and briskness." The galleon's deck was exposed to the fire of the *Centurion's* topmen, who, "having at their first volley driven the Spaniards from their tops, made prodigious havoc with their small arms, killing or wounding every officer but one that ever appeared on the quarter-deck." The "general of the galleon" was wounded, yet he fought his ship an hour after being hit. But the *Centurion's* grapeshot swept the galleon's decks so effectively, and the number of Spanish slain and wounded was so great, that "they began to fall into great disorder, especially as the General, who was the life of the action, was no longer capable of exerting himself."

Early in the engagement the galleon's colors had been burned off the jack staff, and at last the royal standard of Spain was lowered from her main topgallant masthead and she surrendered.

Thus did the *Centurion* gain possession of the Manila ship. She was called *Nostra Signora de Cabadonga* and was commanded by General Don Heronimo de Montero. She was much larger than the *Centurion*, having 550 men and 36 large guns.

On board of her Anson found 1,313,843 pieces of eight, and 35,682 ounces of virgin silver, which we may suppose brought cheer to the hearts of those doughty adventurers who had left Merry England for the purpose of attacking Spain in her distant settlements.

EDITORIAL.

ON LEARNING TO WRITE.

Katharine Fullerton Gerould, writing in the *Atlantic Monthly* on "What constitutes an educated person to-day?" tells us, among other things, that no man can fairly be called educated who has not the power to use his native language correctly. "An educated man can not be illiterate. This test will occasionally exclude a full professor in a reputable university. That makes no difference. No man is educated whose grammar is shaky. He may have a Ph. D. from any place you like; but if he confuses adverbs and adjectives he is not an educated man."

At times we all use the English language carelessly, yet on a perusal of the annual sanitary reports, which should reflect an officer's best efforts, one is struck forcibly by the errors in composition, in grammar, and in rhetoric which some of us persistently make.

Every medical officer should learn to write well early in his career, as much of his reputation depends upon the care with which he prepares his reports and other official correspondence. How may we learn to write? Robert M. Gay, professor of English, Simmons College, Boston, in a little book called "Writing Through Reading," gives us some hints. Writing is an art which can be developed by practice and by careful reading. Bacon said that "reading maketh a full man," and by that he meant that we get the greater part of our ideas, notions, and opinions from reading. But he also said that "writing maketh an exact man;" "writing impresses what we read on the mind and fixes it deeper."

As a discipline in close, thoughtful, and discriminative reading, nothing can be more valuable than having to record in some form the thoughts read. Getting at the thought requires concentrated attention.

The process of writing, as Goethe said, keeps the thoughts from wandering. If the writing has as its object the reproduction of the thoughts read, the reader can not, as he otherwise might, be content with a vague or general apprehension of the passage he is reading. There is a compulsion upon him to understand every word and the relation of each word to every other, and the contribution of each and all to the complete train of thought.

Reproduction of thoughts read has an advantage over original writing in that it permits you very definitely to gauge your success,

and the passage reproduced serves as a standard with which you can always compare your version. Reproduction taxes your vocabulary as original writing is little likely to do. The connection between thought and language is so intimate that our ideas are limited to the words we possess. Reproduction affords a more practical method of acquiring versatility in framing sentences than does original writing.

The competent handling of the sentence is one of the chief marks of maturity in a style. If your sentences are elementary in form—short, simple, disjointed, or loose-jointed—and faulty in rhythm, read the writings of Thomas Babington, Macaulay, or of Lafcadio Hearn. The sound and natural way to master the art of framing sentences is to read the sentences of an author who knows how to make them, and to read them over and over, preferably aloud, in their place and context, until their length, phrasing, and rhythms have been, so to speak, learned by heart. When you have done this make a series of sentences of your own, using different thoughts, but following the exact model of those you have read, one of yours for each of the others, and you will learn very rapidly much about the art of making sentences. But this exercise must be done with alert intelligence, observing how each sentence owes its form solely to the thought, its parts, and their relations.

Good writing is quite largely a matter of feeling. It is partly an affair of the ear, and the ear can best be trained through reading aloud, copying, and memorizing. A good way in which to improve one's writing is to copy, after careful preliminary oral reading, a passage of good contemporary prose, observing its structure and the relations of parts to each other, using the dictionary faithfully, and keeping in mind the fact that you are not merely copying words but are transcribing thoughts, and what you learn in your practice will eventually affect profoundly your original writing.

Direct imitation of the writings of masters has great value in learning to write. In fact, Stevenson said that imitation is the "only way to learn to write." He advised the imitation of as many authors (of the widest diversity of styles) as you can, because only by so doing will you be likely to achieve both facility and versatility in writing. Eventually all the styles you have imitated will commingle; and with the growth of your personality and originality, your own style will emerge, the stronger and richer for your practice. "Before he can tell what cadences he truly prefers," says Stevenson, "the student should have tried all that are possible: before he can choose and preserve a fitting key of words, he should long have practiced the literary scales."

I imagine that in his youth when learning to write, Stevenson read his original over and over aloud, until he had caught the rhythm, cadence, or general movement by ear, and, meanwhile, registered

upon his mind the qualities and idiosyncrasies of the style. Then he took another but suitable subject and tried to express his thoughts on it in the manner of his chosen author. This certainly is a good plan for the improvement of diction and it helps one to achieve vigor of style. Tame expression is usually due to the use of abstract and general words, overworked words, and epithet. Vigorous writing is the result of a knack of using concrete and specific words, homely idioms, and simple metaphors. This knack may be obtained by having care of our speech, by circumspect reading, by discriminating among synonyms, by habitually using the dictionary; but the natural way of acquiring it is by imitating those authors who have it.

In his Autobiography Benjamin Franklin tells us that he learned to write by reading and rereading an essay from the Spectator, meanwhile recording "hints" of the sentiment of each sentence, and then, a day or two later, without looking at the original but using the hints as a guide, writing an essay on the same subject matter and of the same length as the original and then comparing his version with the original in the Spectator on which it was based. Stevenson's plan was distinctly imitative. Franklin's was emulative. He did not try to write *like* Addison but he tried to write *as well* as Addison. Stevenson wrote in the presence of his model; Franklin in its absence. Stevenson used many models; Franklin but one. Franklin's plan is especially good as practice in sentence structure.

The success of Franklin's method lies wholly in the choice of a proper model. For Franklin, the value of the Spectator lay in the variety of its contents. It contained the best journalistic writing of his day. The student of to-day can apply it to specimens of contemporary writing such as might be found in the Atlantic Monthly or Outlook.

ON SEVERAL PHASES OF SYPHILIS.

I remember listening once, in the days before the Wassermann reaction and the use of salvarsan had thrown so much light upon the treatment of syphilis, to a discussion between two old practitioners as to the relative merits of the line of treatment each employed in the "cure of syphilis." In the light of our present knowledge neither of these men knew much about the treatment of this disease and neither had ever cured a single case; but they *did* know a lot about the signs and symptoms of syphilis which in those days of inefficient treatment were seen in all their varieties by everyone in general practice. The modern method of treating syphilis has changed the picture of the disease somewhat and we do not as frequently see what used to be known as its secondary and tertiary manifestations. In

the Navy, syphilis is generally recognized at the onset and promptly treated, with the result that secondary lesions do not appear and are not familiar to the younger generation of medical officers.

Occasionally a patient in the secondary stage of syphilis with its lesions not exactly typical, will pass before us; and we should always bear this disease in mind when confronted by strange skin lesions, and not place too much reliance upon a denial of exposure to infection on the part of the patient. The following case is rather illuminating and shows the difficulties encountered by the medical advisor as well as by the patient.

A man reported at sick call complaining of sore throat and "aching in his bones." His temperature was 102 F. Physical examination revealed a diffuse pustular eruption on his head, body, and extremities. He had enlargement of the post-cervical lymphatic glands and a sore on the penis. He was sent to a hospital with "diagnosis undetermined."

At the hospital he claimed that five days before the appearance of the eruption he had noticed a "ring worm" on the dorsum of his penis which he had treated by application of tincture of iodine which produced an ulceration. He gave a history of sexual intercourse 16 weeks prior to his admission to the hospital. He was emaciated and had lost weight recently. The ulcer on the penis was not especially indurated. There was no general enlargement of the superficial lymphatic glands noted, but the inguinal glands were palpable and there was "possible epitrochlear adenitis." The eruption was multi-form, consisting of vesicles, macules, pustules, and bullae, varying in size from a quarter of an inch to an inch in diameter.

A "dark-field" examination of the serum from the lesions failed to reveal the *Treponema pallidum* and the Wassermann reaction was negative.

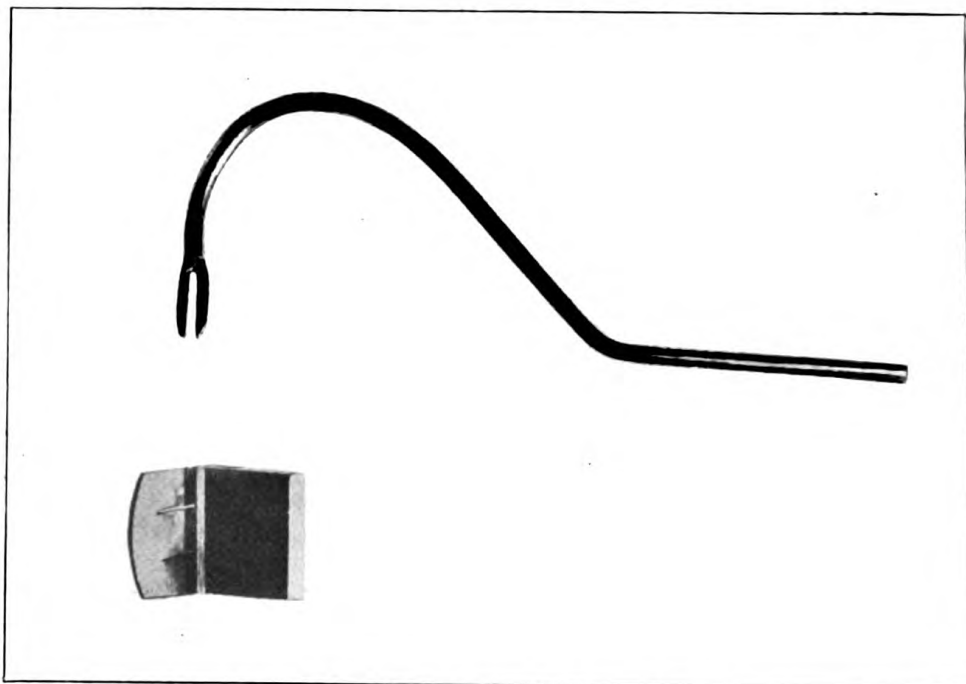
The ulcer was cauterized with silver nitrate and wet dressings of chlorazene were applied. Wet dressings of magnesium sulphate were applied to the skin eruptions and the patient was given, three times a day, increasing doses of Fowler's solution.

There was no improvement in the patient's condition after 10 days of this treatment and the temperature had remained in the neighborhood of 101 F. Syphilis was believed to be the cause of the patient's symptoms, but he would not admit this diagnosis and refused to sign the syphilitic abstract in his health record, although he gave oral permission for the administration of neosalvarsan.

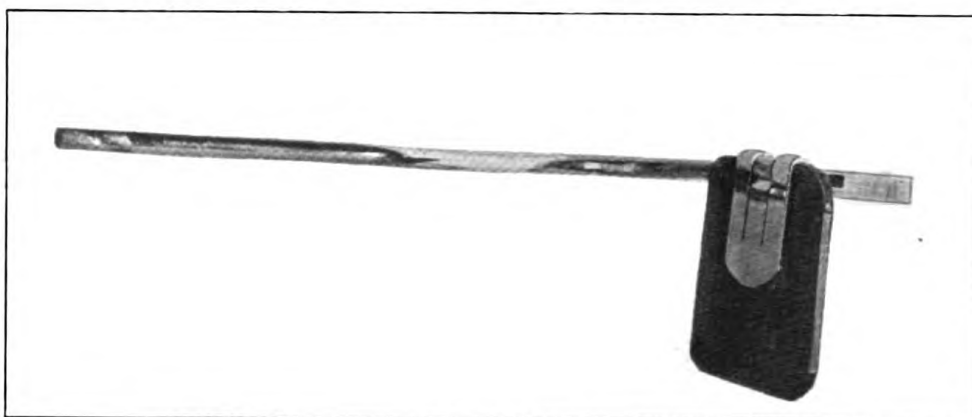
Because of the patient's attitude toward his condition he was transferred to the United States Naval Hospital at Washington, D. C., for observation and treatment. His physical examination, on admission, showed nothing noteworthy except the skin lesions which covered

the entire body. They appeared in successive crops, accompanied by a rise in temperature. Each crop passed through the macular, papular, and pustular stage in three or four days. The pustules became crusted and exuded a purulent exudate. The lesions were surrounded by an inflammatory areola. They were markedly discrete and did not itch, nor were they painful. There was no involvement of the mucous surfaces.

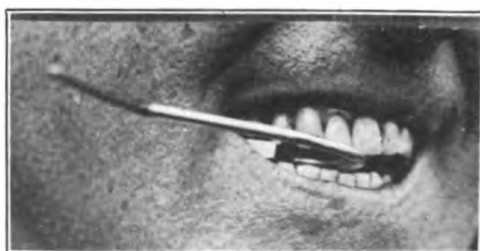
"Dark-field" examinations of lesions were negative for *Treponema pallidum* and two Wassermann reactions were negative. He was given 0.45 grams of neosalvarsan intravenously, and an immediate improvement was noted. The inflammatory areola around the lesions faded rapidly. The ulcer on the penis which had been open now nearly three months began to heal and the lesions on the body began to dry up. His fever disappeared and his general appearance improved. An intensive course of neosalvarsan was begun and coincidentally the Wassermann reaction became positive and remained so for a month. Under the neosalvarsan the condition cleared up. A diagnosis of syphilis was officially made and the patient was discharged to duty under treatment, after being under observation 64 days, during which time the nature of the disease was fully explained to him by his medical advisors. An official communication from this individual recently has been received by the Bureau of Medicine and Surgery, stating that he was not convinced that he had had syphilis and requesting that the diagnosis of syphilis be removed from his health record!



1. HOLDER AND POINTER.



2. FILM IN HOLDER, POINTER ATTACHED.



3. HOLDER AND FILM IN MOUTH,
POINTER ATTACHED.



4. FILM AND HOLDER IN MOUTH,
POINTER DETACHED.

SUGGESTED DEVICES.

DENTAL X-RAY FILM HOLDER.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

A very ingenious and practical film holder has been developed and patented by Lieutenant H. G. Ralph, of the Dental Corps. It consists of two parts, the holder of which goes in the mouth of the patient, and a removable guide or pointer which can be detached after the holder is in position. A portion of the holder projects as a flat metal lug at right angles to the plane of the film, and this lug is held firmly between the closed teeth of the patient while the X-ray is being taken.

The construction and use of this type of holder presents the following advantages:

First. The film is held behind the selected teeth without the possibility of slipping.

Second. The area necessary to obtain a definition of the apices is covered.

Third. The jaws being closed allows relaxation of the adjacent muscles, thus frequently obviating the tendency to gag, particularly when raying the lower posterior molars.

Fourth. A removable pointer indicates the plane and position of the film after it has been inserted in the mouth and the jaws closed, which is a material aid in getting the correct angle for the tube.

Fifth. The holder and pointer are entirely of metal, and can be sterilized by boiling.

Sixth. The appliance is of sufficient durability to be practically indestructible.

In lieu of a more detailed description illustrations are given.

SUGGESTION FOR RECORDING DENTAL CONDITIONS.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

The following system is one which has been found to meet the requirements for recording at the chair the first dental examination, without the aid of an assistant:

Letter-size paper is cut in three strips, corresponding to the folds of official correspondence.

A space of 2 inches is left at the top of a slip for the name, rank, date, and ship or station. Abbreviations are made down the left side of the sheet for conditions to be noted. M for missing teeth, Ro for roots only, C for caries, Am for amalgam fillings, G for gold fillings, G. C. for gold crowns, Cem for cement fillings, and Br for bridges.

When the examination is to be made a slip is placed upon the bracket table and a pencil is wiped with Dakin's solution to prevent the possibility of cross infection.

It has been found convenient to first ascertain the teeth missing, which are noted by numbers after M., and then to record fully the condition of each tooth, starting with the tooth of the lowest number and placing after the proper abbreviation the number of the tooth and location of cavity or restoration. Thus we have upon completion of the rough chart:

Brown, John Bryan, S-2; Hospital, Washington, D. C.; June 29, 1921.

M. 1-16.

C. 2-DO; 7-M; 30-O.

Am. 3-MoD; 31-DO.

G. 8-M.

Cem. 9-M.

Br. 12-14.

GC PF PF GC.

As work is performed it can be noted on the reverse side of the sheet under date, and initialed by the dental officer, in addition to the entry in the record book.

When time permits the smooth dental abstract and dental record can be made from the rough sheet as outlined above, as all data necessary for completing the smooth records will be at hand.



ULCERATIVE LESIONS OF SPOROTRICHOSIS.

CLINICAL NOTES.

A CASE OF CUTANEOUS SPOROTRICHOSIS.

By R. E. HOYT, Commander, Medical Corps, United States Navy.

From the viewpoint of differential diagnosis the following case presents many interesting details and brings up for consideration several affections not often encountered in routine practice.

T. J. D. GM—3cl. American, single, age 20, was admitted to the hospital on April 29, with the diagnosis of purpura, hemorrhagic.

His family history was irrelevant, showing nothing to indicate any congenital blood disease, syphilis, tuberculosis, or chronic skin affections.

With the exception of measles in childhood the patient has always been well, robust, and active. He has led an out-of-door life, taken an active part in athletics, and after entering the Navy was a member of the ship's race-boat crew. His weight was 185 pounds before present illness.

He enlisted in 1919 and was assigned to the U. S. S. *Arizona*, on which ship he served up to the time of his transfer to the hospital. During February and March of the present year the ship visited Guantanamo Bay, Cuba; Callao, in South America; Balboa in Panama, and then returned to Guantanamo. The patient was ashore at all points visited on short sight-seeing trips not lasting over a few hours.

The present illness began on April 20, two weeks after the ship returned to Guantanamo, the patient first noticing a small, hard, slightly tender swelling on the inner side of left leg just above the ankle, which slowly increased in size, softened, and on the fourth day ruptured, with a discharge of considerable bloody fluid.

A few days later similar lumps of varying size and consistency were noticed on the inner side of the left leg and thigh, and by the end of the second week lesions had made their appearance on the right leg and thigh and a few on the arms.

Practically all the swellings underwent changes similar to the initial lesion—enlargement, softening, thinning, and discoloration of the skin followed by rupture and the discharge of bloody or purulent material.

On the legs and thighs the discharge gradually subsided and ulcers of varying size and depth formed over the sites of the primary swellings. On the arms no ulcer formation occurred, the skin slowly healing over after the discharge had stopped, leaving a small, depressed, discolored area to show where the lesion had been.

With the exception of the above-described lesions, physical examination at the time of admission showed nothing abnormal.

The pulse and temperature were normal. No glandular enlargement. Red, white, differential counts, hemoglobin estimation, and blood-clotting time were normal. Urine normal. Wassermann negative. Blood cultures and cultures of discharges from the ulcers and from fluid aspirated from the subdermal swellings before ulceration occurred were all sterile.

There was no history of any injury or abrasion. No drugs had been taken internally. After rowing, the patient had been accustomed to receiving a rubdown with soap liniment, commonly used on shipboard by members of athletic teams.

During the month following his admission to the hospital the number of lesions increased from about 30 to 75 or 80. The legs and thighs were chiefly affected. A tendency to extension upward over the buttocks and lower lumbar region posteriorly was noticeable, the lesions here being first noticed as hard, circumscribed, subdermal lumps about the size of a pea. Several swellings appeared on the arms and one on the lobe of the right ear.

It was found that by making a very small incision or by aspirating these swellings after softening occurred and before thinning or ulceration of the skin took place the ulcer formation could be easily prevented, the incision healing slowly after a few days' drainage.

During the fourth week of the patient's stay at the hospital, loss of appetite, a feeling of nausea and slight indefinite epigastric pain with evening elevation of temperature to 102° appeared. Following an attempt to swallow a duodenal tube, which caused considerable retching, the patient vomited a quantity of dark bloody material similar to that obtained after rupture of a skin lesion. This was followed by the disappearance of all symptoms and a decline of temperature to normal. Evidently a lesion similar to those present in the subcutaneous tissues had formed and ruptured, either in the stomach or lower esophagus.

At about this time the formation of new lesions ceased and the ulcers gradually filled in and healed over.

With the exception of some loss in weight due chiefly to the confinement to bed, the patient's general condition continued excellent.

For the purpose of establishing a diagnosis the salient points in the above history may be summed up somewhat as follows:

1. The rather sudden appearance in an otherwise apparently normal individual of firm, circumscribed, noninflammatory swellings beginning in the subcutaneous tissue of one leg and extending gradually to all extremities and later to the lower and posterior part of trunk; these swellings followed in a few days by distinct areas of softening, followed by thinning and discoloration of the overlying skin, which on rupturing resulted in the discharge of considerable dark red or yellow purulent material; over these areas of softening, especially on the legs, the development of ulcers of varying size and depth, some extensive, shallow, and irregular, others small, deep, and having a punched-out appearance and communicating with subcutaneous cavities of considerable extent, these cavities representing the spaces occupied by the initial nodular lesions; lesions discovered before the skin necrosis occurred and incised or aspirated showing a discharge of considerable bloody, brown, or yellow serum or sero-purulent material and healing more or less promptly after the contents of the swelling had drained away.

2. The lack of evidence of an acute inflammatory process, as shown by normal temperature, normal blood counts; no typical signs of inflammation, such as redness, edema, or induration of tissues; and repeated negative cultures from the blood and material from the lesions. (It should be stated that at the time patient did show a temporary elevation of temperature with abdominal symptoms, blood cultures were negative and white count remained normal.)

3. The elimination of the possibility of luetic infection by an absolutely negative history, absence of any typical physical signs and repeated negative Wassermann tests carefully controlled.

From a careful consideration of the above facts it does not appear that the diagnosis of hemorrhagic purpura can be substantiated, although the appearance of bloody discharges from some of the lesions and purpurallike spots might at first sight suggest this condition. The appearance of these spots seemed to follow the softening of, and to exist over, a softened subdermal lesion of some days standing, the purpuriclike discoloration being rather the result of a thinning and pressure necrosis of the skin than of actual effusion of blood into the skin layers as is typical in purpura. Furthermore, the absence of any symptoms of grave constitutional involvement and the nonexistence of purpuric spots on mucous membranes would be rather against this condition.

Among the conditions which in some instances present lesions similar to those described in the present case may be mentioned syphilis, yaws, cutaneous tuberculosis, sarcoma cutis, fungoid granuloma, erythema induratum, and sporotrichosis.

From a careful consideration of the history, the absence of any other characteristic signs or symptoms, and the persistently negative Wassermann test, it appears logical to eliminate syphilis and yaws.

The comparatively acute course of the present case, the otherwise healthy condition of the patient, the absence of the characteristics of malignant disease, and the prompt healing of the lesions under treatment renders the diagnosis of cutaneous tuberculosis of any variety, sarcoma, or granuloma very unlikely. Negative inoculation experiments are also points against tuberculosis.

Although erythema induratum is described as of probable tubercular origin, occurring almost exclusively in females predisposed to this disease, efforts to isolate the organism from the lesions have not proved successful. Its rare occurrence in the male, the limitation of lesions to legs in nearly all cases, the sluggishness of evolution and absence of the profuse bloody or purulent discharge from the softened areas are points which render this diagnosis improbable, although some few cases with very atypical lesions have been described.

Clinically, the resemblance of the present case to descriptions of cutaneous sporotrichosis is quite marked. In both are found subdermal nodules which soften, rupture, and discharge purulentlike material, through the central skin ulceration. No general systemic disturbances are noted, no blood changes, no signs of inflammation or acute bacterial infection.

The sanguinous character of the discharge from some of the lesions as in the present case is not mentioned in the descriptions of the few cases of sporotrichosis reported. Its occurrence, however, from only the older lesions in which softening is well advanced, with considerable undermining of the skin layers and probable involvement of the smaller superficial veins in the softening process would not be incompatible with the pathological processes encountered in this affection.

Another clinical point of some importance is the apparent beneficial effect of potassium iodide. Coincident with the internal administration of this drug, the formation of new lesions gradually ceased, and the healing of the leg ulcers become more evident. The action of this drug is described by most authorities as curative in sporotrichosis.

Numerous examinations of smears taken from the lesions in all stages of development, while at times showing objects closely resembling spores have not given sufficiently definite results to warrant a positive diagnosis, and mycelial threads were not found. The great difficulty in finding these threads in stained specimens of the material from the lesions is emphasized in all accounts of the disease, but all authorities agree on the comparative ease with which the organism can be cultivated on any ordinary culture media.

During the first weeks of the disease, therefore, the establishment of a definite diagnosis of sporotrichosis was rendered impossible on account of negative culture and inoculation experiments, although it

was the general opinion that the causal organism was the sporotrichium or an allied nonbacterial fungus.

The unexpected appearance of three new lesions in July, after all ulcers had completely healed and the treatment with potassium iodide had been temporarily discontinued, provided material for further investigation which this time proved more successful.

From cultures made with the seropurulent material aspirated from these lesions typical growths of the sporotrichium were obtained on glucose agar tubes, plates, and hanging drop cultures, and smears from these growths showed pure cultures of the organism. The mycelial threads and arrangement of spores were quite characteristic when examined unstained by the hanging drop method.

The diagnosis of cutaneous sporotrichosis, provisionally made from the clinical findings, was therefore confirmed.

The patient was at first treated with potassium iodide, 2 grams daily; later he was given sodium iodide intravenously twice weekly, and no new lesions have appeared to date.

The great importance of differentiating sporotrichosis from cutaneous syphilis should be especially emphasized. The resemblance is so close in some instances that a type called "syphiloid sporotrichosis" has been described. This similarity in lesions with marked improvement under iodides conduces to the diagnosis of syphilis unless the disease sporotrichosis is borne constantly in mind and either confirmed or eliminated by bacteriological procedures. Even with a positive Wassermann the possibility of sporotrichium infection should be eliminated before the skin lesions are recorded definitely as syphilitic.

FIRST REPORT OF PELLAGRA IN HAITI.

By G. F. CLARK, Lieutenant Commander, Medical Corps, United States Navy.

The following cases seen at Cape Haitien are reported as the first of the kind ever noted in Haiti. Surgeon Joseph Goldberger, U. S. Public Health Service, states that no pellagra is definitely known to have occurred in Haiti before.

CASE 1. H. D. Female, mulatto. Age 32. Admitted April 7, 1920, with pellagra. Examination showed an inflamed tongue; characteristic, symmetrical eruption on the backs of the hands, and extending up the lower one-third forearms; some pigmentation on each side of nose. History of diarrhea. There was some retardation of speech. Since admission she has had several periods of mild melancholia, and at other times she has had periods when she seemed unusually gay. The eruption on the hands has cleared up, but the tongue shows some fissures. The patient is constipated from time to time.

CASE 2. N. S. J. Female, mulatto. Age 35. Admitted March 8, 1920; discharged apparently well July 7, 1920. She had characteristic, symmetrical eruption on the backs of the hands and extending up the lower third of forearms. Tongue inflamed; diarrhea. No nervous manifestations, except slight retardation of speech. The area of eruption showed a decided darkening from pigmentation. Operated on for fistula-in-ano and made a good recovery.

CASE 3. A. S. Female. Age 37. Admitted November 7, 1920; died November 27, 1920. She had inflamed tongue, diarrhea, and symmetrical eruption on the backs of the hands and forearms. She steadily became worse after admission and died within three weeks. There were no mental symptoms except retardation of speech.

In connection with the above cases it is interesting to note that the caloric value of the ration in the hospital is about 1,800, owing to very limited funds. The three patients were each given citrated beef blood, with the results above noted.

ACUTE RHEUMATIC FEVER.

By W. M. ALBERTY, Lieutenant, Medical Corps, United States Navy.

It is the purpose of this paper to review some 35 cases of acute rheumatic fever that have come under our observation during the last six months. Especial attention has been directed toward the etiology, or rather the foci of infection, responsible for these cases and the complications that have developed. No cases of the chronic forms have been included in this series.

The definition of acute rheumatic fever, according to Osler, is "an acute infection, depending upon an unknown infective agent and characterized by multiple arthritis and a tendency toward involvement of the endocardium of the heart valves." Geographical distribution, age, and sex have little bearing as to etiology. Up to the present time there has been no organism isolated that we can definitely say is the causative agent. Numerous authors have isolated many different organisms and cited them as the etiological factors, and they might have been in those particular infections. Numerous strains of staphylococci, streptococci, and various other organisms have been demonstrated in the joints, blood, and endocardium, and all have been blamed as the cause of rheumatic fever. For instance, Rosenow, in 1914, isolated three different strains of diplostreptococci from the joints, blood, and tonsils of acute cases and was able to produce the signs and symptoms of rheumatism with its complications by animal inoculation. Another author was able to produce the typical myocardial nodules with the *Streptococcus viridans* by animal inoculation. A short time ago, an organism, the *Mycobacillus syn-*

ovialis, was isolated from the joints and pia mater of a case of cerebral rheumatism and given as the cause of the disease.

So far, I think, joint aspirations have proven negative in a majority of the cases. The futile attempt of numerous investigators to demonstrate organisms in the joints from the blood and the heart valves has left us in the dark as to the direct causative factor in nearly all cases. Riesman, of Philadelphia, in a recent article, advances the theory that the joint manifestations are probably anaphylactic reactions, the result of some foreign protein absorption. This theory is supported by the sudden onset of the joint conditions, the sterility of the joints, and the rapidity with which they subside. Such reactions are not uncommonly seen in serum therapy. The same author suggests the possibility of a filtrable or ultramicroscopical virus.

In attempting to locate the offending focus or foci the following data were collected.

Ten cases, or 28.5 per cent of the entire series, immediately followed an acute attack of tonsillitis.

Eight cases, or 22.85 per cent, gave a history of previous attacks of tonsillitis not directly preceding the rheumatic attack.

Three cases, or 8.56 per cent, gave no history of tonsillitis, but showed a chronic infection of the tonsils. From the above it will be seen that 60 per cent of the cases resulted from infection in the tonsils.

In three cases, or 8.56 per cent, abscessed teeth were demonstrated; no other foci were present.

One case, or 2.86 per cent, was preceded by an acute otitis media, and no other focus was found.

Two cases, or 5.72 per cent, were ushered in by an acute attack of bronchitis, and no other focus was located.

In eight cases, or 22.85 per cent, there was no demonstrable focus.

No effort was made to isolate the organism from the tonsils and no joint aspirations were performed. Work of this sort has frequently been done by other investigators.

The laboratory findings in a number of these cases are as follows:

Blood cultures were taken from 19 of the patients, often two or more times in some instances; all were negative.

The average leucocyte count of 29 patients, taken at the height of the fever, was 12,000.

Average red blood count, taken in 16 cases, was 4,200,000.

Hemoglobin in 16 cases averaged 82 per cent.

It will be noted that a very marked anemia did not exist in these cases, as has been pointed out as one of the characteristics of the disease.

Urine was positive for albumin in only two or three cases, and the condition cleared up rapidly in all of the patients.

Regarding the complications, of which nearly all were referable to the heart, the following points were noted: Mitral lesion, as evidenced by a mitral systolic murmur, was found in 17 cases, or 48.5 per cent of the series. Three, or 8.5 per cent, of the above mitral lesions were accompanied by an aortic lesion.

Pericarditis of the acute fibrinous type, as evidenced by a definite friction rub, was demonstrated in four cases. In none of these cases was there a pericardial effusion demonstrated. However, there probably was some effusion in all of these cases, but not in sufficient amount to demonstrate by physical examination.

Myocardial involvement was present in six cases. This diagnosis was made only in those cases showing dilatation and a weak muscle tone. However, it is hard to realize an involvement of a number of the other structures of the heart without some involvement of the myocardium.

Pleural effusion occurred in only one case in sufficient amount to demonstrate physically. Otitis media developed in two cases.

The patients all appeared to be extremely ill upon admission and nearly all suffered acute pain in the joints. Multiple involvement was the rule, with a tendency to shift from one joint to another. The pain usually subsided in 24 to 48 hours. The temperature averaged about 100° and extended over a period of about eight days.

The treatment in these cases was symptomatic during the acute stages. It consisted of rest in bed, splinting of the affected joints, liquid diet in case of high temperature, and saturating the patient with sodium salicylate. The latter was given routinely in 45-grain doses with the same amount of sodium bicarbonate, and was continued as long as the patient ran a fever or complained of joint pains. It was found that the patients tolerated the large doses of salicylate very well, there being only one or two cases in whom it was necessary to discontinue the drug. Three cases received 180 grains at one dose, by mistake. One of these showed toxic symptoms, evidenced by epigastric pain, nausea and vomiting, which subsided in a very few hours. The other two showed no toxic symptoms whatever.

Patients were kept in bed 10 days following the subsidence of temperature. In cases of heart lesions they were confined for a much longer period and were then allowed up very gradually. All heart cases were given tincture of digitalis, at first in massive doses, and later, after the patient had been digitalized, in smaller doses. Many of these cases require digitalis and graduated exercises over a long period of time if good functional results are to be obtained.

The use of salicylates is almost universal, yet why they are given is not exactly clear. The idea of their being specific is almost aban-

cloned at present. Many contend that they shorten the disease but this has never been definitely proven. That they prevent cardiac involvement is rather far-fetched and certainly did not hold true in our cases, as heart lesions often developed in this series after days of thorough saturation with sodium salicylate. There is one argument in favor of the salicylates, their analgesic property. It is true that they are antipyretic, but this is certainly not the effect which we desire when using salicylates in cases of rheumatic fever. That salicylates will relieve pain, and do so fairly rapidly, has been proven beyond a doubt, and it is for this purpose that they are prescribed.

Following the acute stage the patients were referred to specialists for tonsillectomy, dental treatment, or the ridding of any other focus of infection that might have been demonstrated. Clearing up the focus of infection, which is probably present in 85 to 90 per cent of all cases, is considered the only means by which a definite cure may be effected. A large number of tonsillectomies were done, but not in every instance in which the operation was advised, due to the lack of cooperation on the part of some patients. It is impossible from this series to draw any conclusion as to the ultimate cures that were effected by clearing up the different foci of infection. Some of these patients are still under treatment, many have gone to duty, and a small percentage have been invalided from the service. Many cases which showed a very marked heart lesion during the course of the disease have gone to duty with an almost inaudible murmur and a perfect heart function. It is difficult to give, at this time, any prognosis as to the recurrence of the symptoms, as not sufficient time has elapsed since the acute manifestation, and it is difficult to keep in touch with a number of these patients after their discharge from the hospital. St. Lawrence reported a large series of cases in whom tonsillectomy had been performed and there had been no recurrence in 84 per cent of the cases, observed over a period of three and one-half years. These observations were made on children in whom other foci of infection were fairly easy to rule out.

In conclusion, I wish to emphasize the following points that have been brought out in this paper, namely: That the joint manifestations are probably anaphylactic reactions, due to absorption of foreign proteins, in the majority of cases through the tonsils; that infected tonsils were responsible for 60 per cent of the attacks reported in this series, while some 17 per cent were brought on by infections of the teeth, ears, and lungs; that 22.85 per cent presented no demonstrable focus, which, the writer believes, was present in practically all cases but was not demonstrated; that numerous negative blood cultures have proven the sterility of the circulation at different stages of the disease; that heart lesions were present in 48.5 per cent

of the cases, the largest percentage being uncomplicated mitral lesions; that the prognosis in case of heart complications is good, provided the condition is recognized early and appropriate treatment instituted; that salicylate therapy is only symptomatic, relieving pain, and its value as a specific or in preventing cardiac complications is negligible; and lastly that a permanent cure depends upon the demonstration of the offending focus of infection and its thorough eradication.

A CASE OF POISONING BY OIL OF CHENOPODIUM.

By B. F. NORWOOD, Lieutenant, Medical Corps, United States Navy.

The oil of chenopodium is a pale yellow essential oil distilled from *Chenopodium Ambrosioides* (*Anthelminticum*), commonly known as American wormseed, which grows wild in the southern portion of the United States. It has a characteristic odor and a disagreeable taste. The drug has become popular in recent years because of its value as an intestinal parasiticide and is being extensively used in the treatment of intestinal nematodes. At present it is supposed to be the most effective agent against ankylostomiasis.

Though the effective use of this medicine on a large scale has fully established its field of usefulness in the elimination of intestinal parasites, the more prominent workers have not allowed it to supersede the use of thymol. Opinion as to the usefulness of these two drugs seems about equally divided. In a small number of infections, something less than 2,000, we obtained a greater percentage of egg-free stools in those treated with chenopodium than with thymol, and a few cases not clearing up under two or three thymol treatments responded to it. The whip worm (*Trichocephalus dispar*) seems especially resistant to the drug.

The value of chenopodium as an intestinal parasiticide being fully established, its use in the treatment of amebic dysentery was suggested to the earlier workers who have favorably reported on its use in a large number of cases. An apparently magical result has been obtained in a great percentage of cases treated, the amebæ disappearing from the stools in from the second to the fifth day and remaining absent throughout the usual period in which a relapse might be expected.

Chenopodium is a dangerous drug, and its application by persons not experienced in its use may result fatally. On the other hand, too much caution manifested by the administration of insufficient dosage may entirely defeat the result desired. A drop is not equivalent to a minim, and insufficient dosage is usually obtained by dispensing 16 drops as the equivalent of a mil. The factors governing the size of a

drop of this oil are varied, among which are the age and temperature of the drug, the size of the opening in the dropper, the column of oil in the dropper, and the angle at which it is held. In cases where a definite number of minims is to be dispensed the estimation of the average number of drops to a mil from a sample of the oil dropped from a selected dropper may be obtained to insure a practical element of safety and sufficient accuracy. In experimenting with a number of droppers we have found the number of drops to a mil to vary from 36 to 45. It is obvious, therefore, that the measured dose is the reliable and safe one.

The Bureau of Chemistry at Washington, through the experiments of Salant, Nelson, Livingston, and others, has conducted intensive pharmacologic investigations to determine as fully as possible the action of the drug in the hope that the results of their experiments would place its use on a more practical basis. They advise caution in dispensing the drug, as when taken internally it affects the central nervous system, the heart, respiration, digestive organs, and the kidneys. Its use is contraindicated in advanced cases of chronic nephritis and heart disease. They further believe that the liver plays an important part in detoxifying the drug and that abnormal changes in the gastric and intestinal mucosa may accelerate its absorption.

It may therefore prove more toxic in hepatic and gastro intestinal diseases. They have further established, through extensive experiments on animals, that the nutritional condition of the subject is a large factor in determining the toxicity of oil of chenopodium and that this also applies to the human subject. Oil of chenopodium should be administered with caution to the weak and poorly nourished.

The symptoms of poisoning by the drug are of gastrointestinal and neurotoxic type. The first is manifested by a sensation of heat and burning in the stomach and colicky intestinal pains, accompanied in some cases by nausea and vomiting. This type is usually mild, occurs quite frequently in dispensary practice, and is not of sufficient severity to cause alarm and usually passes off in a few hours. Such symptoms, however, are sometimes the forerunner of a severe poisoning, indicated by violent retching, purging, and collapse; death might ensue. The neurotoxic symptoms are tinnitus aurium, and numbness and tingling of the hands and fingers usually accompany the mild gastrointestinal symptoms. The more severe symptoms of the neurotoxic type are frontal headache, almost total deafness, general muscular weakness, and collapse, followed by a definite muscular incoordination, tetany, mental incoherence, delirium, convulsions, and coma. This group of severe symptoms appears on the second or third day and may not be accompanied by

any gastrointestinal symptoms. A pronounced spasticity of the intestinal musculature, as evidenced by a doughy, lifeless feeling of the abdomen, appears early. Peristalsis seems to be completely inhibited.

The administration of oil of chenopodium in castor oil is believed to minimize the danger considerably, and especially if followed within one or two hours by a large dose of castor oil. It is, at least, a good routine procedure in dispensary practice where a great proportion of the patients treated are weak and poorly nourished. Salant after an intensive study of the toxic effect of the drug on animals and in accord with the views of Hall and Foster, believes castor oil to be of great prophylactic value and strongly recommends its use. There is no chemical antidote for the drug, the treatment in cases of poisoning being symptomatic.

The case reported below took 11 measured mls of the drug in 20 mls of castor oil within two hours, 10 mls of which were administered at a single dose. Marked ringing in the ears and interference with hearing, a slight burning sensation in the epigastrium, an apparent inhibition of intestinal peristalsis, partial collapse, and slowing of the respiration and pulse occurred within 30 minutes after the ingestion of this dose of the drug.

L. L., sergeant, U. S. Marine Corps, reported at the sick bay in Managua on July 12, 1920, and was admitted to the sick list with a tentative diagnosis of amebic dysentery, which diagnosis was confirmed shortly afterward by observing motile *Entameba histolytica*, with ingested erythrocytes, in mucus from a specimen of a fresh stool. His temperature upon admission was 101° and he was passing 8 to 10 stools daily which contained considerable mucus and blood. Physical examination was negative with the exception of a slight loss in weight.

As observed above, oil of chenopodium in the treatment of amebic dysentery has been favorably commented upon and it was decided to use it in the treatment of this case. The medical officer, therefore, ordered the following: Oil chenopodium 10 minims and castor oil 10 mls, to be mixed and given two hours apart for two doses, repeating daily for three days. The bowels were emptied the night before by the administration of an ounce of castor oil and proper dietary routine was established. The ward routine called for the chenopodium to be given at 6 and 8 a. m., followed at 10 a. m. by an ounce of castor oil.

On the second day of the treatment the man in charge of the ward gave the first morning dose at 8 a. m., and being occupied with sick-call routine, ordered his assistant, a hospital apprentice and a novice in the service, to give the treatment, verbally informing him of its

composition. The hospital apprentice, mistaking minims for mils, carefully measured out 10 mils of oil of chenopodium and a like amount of castor oil, mixed the medicines, and gave it to the patient. After completing sick call at 8.45 the medical officer, while making rounds in the ward, noticed that a grave change had come over the patient. He appeared greatly prostrated, had an anxious facial expression, and was perspiring profusely. He stated he felt all right until "that last dose of medicine." His body was bathed in cold perspiration, the pupils moderately dilated, but reacted to light and accommodation; the pulse was soft and compressible with a rate of 60 to the minute. The respiration was shallow with an apparently forced inspiratory effort; its rate was 11 to the minute. The patient was fully oriented and conscious. The reflexes were normal, but he complained of ringing in the ears, which interfered with hearing. The lips and tongue were dry; the temperature was 97.4 F.

It was at once surmised that the patient was either manifesting an idiosyncrasy to the drug or had been given an overdose. The hospital corpsmen concerned admitted their error; the hospital apprentice stating that he gave the patient by mistake 10 mils of the drug, or the same amount as of castor oil, and produced a 10 mil graduate in which it had been measured. As the condition of the patient was rapidly approaching a state of general collapse, camphor in oil and adrenalin were given at once by hypodermic and digitalin and strychnin ordered to be given every six hours as a routine stimulant. An ounce and a half each of olive and castor oils were given and external heat applied. A high rectal injection of 8 ounces of olive oil was given and retained 2 hours. The response to the above measures was prompt, the pulse attaining a rate of 72 to the minute and becoming of good volume; at the end of an hour the respiratory rate was 20 to the minute, with considerable improvement in the respiratory excursion. Tinnitus aurium increased rapidly; the pupils were more dilated and less sensitive to light; the patient was more restless. A high soapsuds enema gave a clear return which contained many oil globules and an odor of chenopodium. Three hours later the patient became semistuporous, though he could be aroused, when he recognized attendants, but was quite deaf, hearing only the loudly spoken voice close to the ear; prostration to a marked degree persisted.

During the first day the patient was given by mouth 16 ounces of nutriment (cereal and albumin water) and 5 ounces of water. He swallowed with difficulty, however. No urine was voided. The second, third, and fourth days witnessed the patient passing into a marked stupor from which he could not be aroused. Deglutition became even more difficult and a complete intestinal stasis intervened.

The entire abdomen, though not presenting a definite muscular rigidity, was retracted (scaphoid), doughy, and felt lifeless. The legs and feet were extended and resistant when an effort to flex was attempted; the hands were partially flexed at the wrist, the fingers flexed at the metacarpo-phalangeal joints, the phalanges extended, and the whole hand drawn toward the ulnar side with the flexed thumb adducted on the palm, the typical accoucheur's hand of tetany. A meningismus appeared at this time. The ocular reflexes were more sluggish, the pupils slightly unequal; the skin dry and warm, the rectal temperature being 103.2 F., having gradually risen during the past three days from the initial temperature of 97.2°. The voluntary output of urine on the second and third days averaged 650 mls for each 24 hours. Also, on the third day small particles of well-formed fecal matter were recovered from the return of a high soap-suds enema. The respiration and pulse were precarious, the breathing extremely shallow and accompanied by a gasping inspiratory effort, with an alarming pause between excursions; the pulse was irregular and weak.

Late in the afternoon of the fourth day the patient had flights of active delirium, the temperature reached its highest point (103.2 F.), and involuntary urination and defecation occurred. The most critical stage of cardiac and respiratory failure took place at this time. Rapidly diffusible stimulants, as ether, camphor, adrenalin, and ammonia, were resorted to in addition to routine stimulation with digitalin and strychnin. Saline by rectum (Murphy drip) was started at this time and continued throughout each day, with proper intervals of rest, for seven days, the average daily retention of 3,000 mls being recorded. The urinary output continued satisfactory. The patient was given by mouth a daily average of 31 ounces of nutriment (eggnog with whisky, rich soups, cereal, and albumin waters) and 35 ounces of water. Due to difficult deglutition the greatest patience was required in giving nutriment and water by mouth.

On the fifth and sixth days the patient's delirium was of a maniacal type, and it was necessary to forcibly restrain him; he suffered hallucinations of persecution by the attendants and would attempt to attack them. Opiates had little effect on this condition.

A general collapse was feared throughout the whole of the seventh day, as the patient was rapidly becoming exhausted by constant struggling during the height of his delirium. The prognosis became exceedingly grave. Later in the day the delirium passed into that of the muttering type with a marked increase in the character of the tonic spasms (tetany) of the muscle groups involved, accompanied by a definite and pronounced retraction of the neck and spasm of the neck muscles. The respiration was extremely shallow and inter-

rupted by a forcible inspiratory effort, though cyanosis was not present; the pulse was slow, weak, and irregular.

On the eighth day the patient was more quiet, but could not be aroused. Some improvement occurred in the character of the pulse and respiration; water and nutriment intake was as usual. The patient involuntarily voided 1,250 mls of urine and passed a brown, semiformed stool. His restlessness increased later in the day, but he was not violent and he enjoyed intervals of complete quiet and appeared to sleep.

Consciousness returned on the ninth day, though his mentality was decidedly hazy and delusions and hallucinations, though of a milder character, persisted. He did not recognize attendants, but asked for food and complained of a severe ringing in the ears. He was quite deaf, apparently barely hearing the loudly spoken voice close to the ear. He would answer questions in an irrational manner and persistently maintained that the barracks was a battleship. Tetanic (tonic) spasm of the muscles was not marked, though still could be recognized; there was no change in the character of the meningismus. One thousand mls of urine and a well-formed stool were passed during the day.

On the tenth day the patient's consciousness fully returned, though he was mentally confused; tetany completely disappeared, though the meningismus persisted; all of the reflexes approached normal; urinary and fecal output became normal and voluntary. He took water and nourishment readily, as a liberal soft diet was started at this time. The patient's mentality and general condition rapidly improved, though tinnitus and partial deafness persisted for some time.

Daily examinations of the urine failed to reveal the slightest evidence of albumin, blood, or other destructive kidney changes. Examination of stools before the poisonous dose of chenopodium had been given showed several very sluggish ameba with considerable degenerative changes. Stools subsequently examined did not contain ameba, mucus, or blood. Examination of a formed specimen on the thirteenth day, as well as weekly examinations for the past 10 months, have not revealed ameba. The ringing in the ears rapidly passed away and the hearing became fully normal at the end of the fourth week. Unfortunately, blood-pressure observations were not made during the course of the patient's illness. At this writing, 10 months later, the patient's mentality is fully normal and his general condition excellent.

REFERENCES.

- (1) Salant, W., Jour. Am. Med. Asso., December 15, 1917.
- (2) Hall, M., and Foster, W., Jour. Am. Med. Asso., June 30, 1917.

62090—21—8

BRUSHING THE TEETH.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

The majority of toothbrushes exhibited for sale, and consequently the majority in use, are too large for efficiently brushing the teeth.

A moment's reflection will convince the thinker that the tooth surfaces ordinarily cleansed by the tongue, cheeks, and by the food during the process of mastication are the ones least in need of scouring with a brush, yet these surfaces are the only ones ordinarily reached when using a large brush in an indifferent manner.

A large percentage of all individuals are inflicted with pyorrhoea when middle adult life is reached and passed, and therefore a method of brushing the teeth which also brushes and massages the gums is an important factor in the prevention of this disease.

A very common error is that which holds bacterial invasion as the cause of pyorrhoea, but to quote from the report of a committee of the American Academy of Periodontology on case management:

"Lowered resistance of periodontal tissues to disease is caused by the action of one or more etiological factors, those most commonly present being traumatic occlusion and any of the local conditions causing irritation and favoring the collection of débris, with its attendant bacterial growth.

"The bacteria responsible for the infection are secondary etiological factors and determine the type of disease. Invasion of the periodontal tissues by normal mouth flora depends wholly upon tissue conditions.

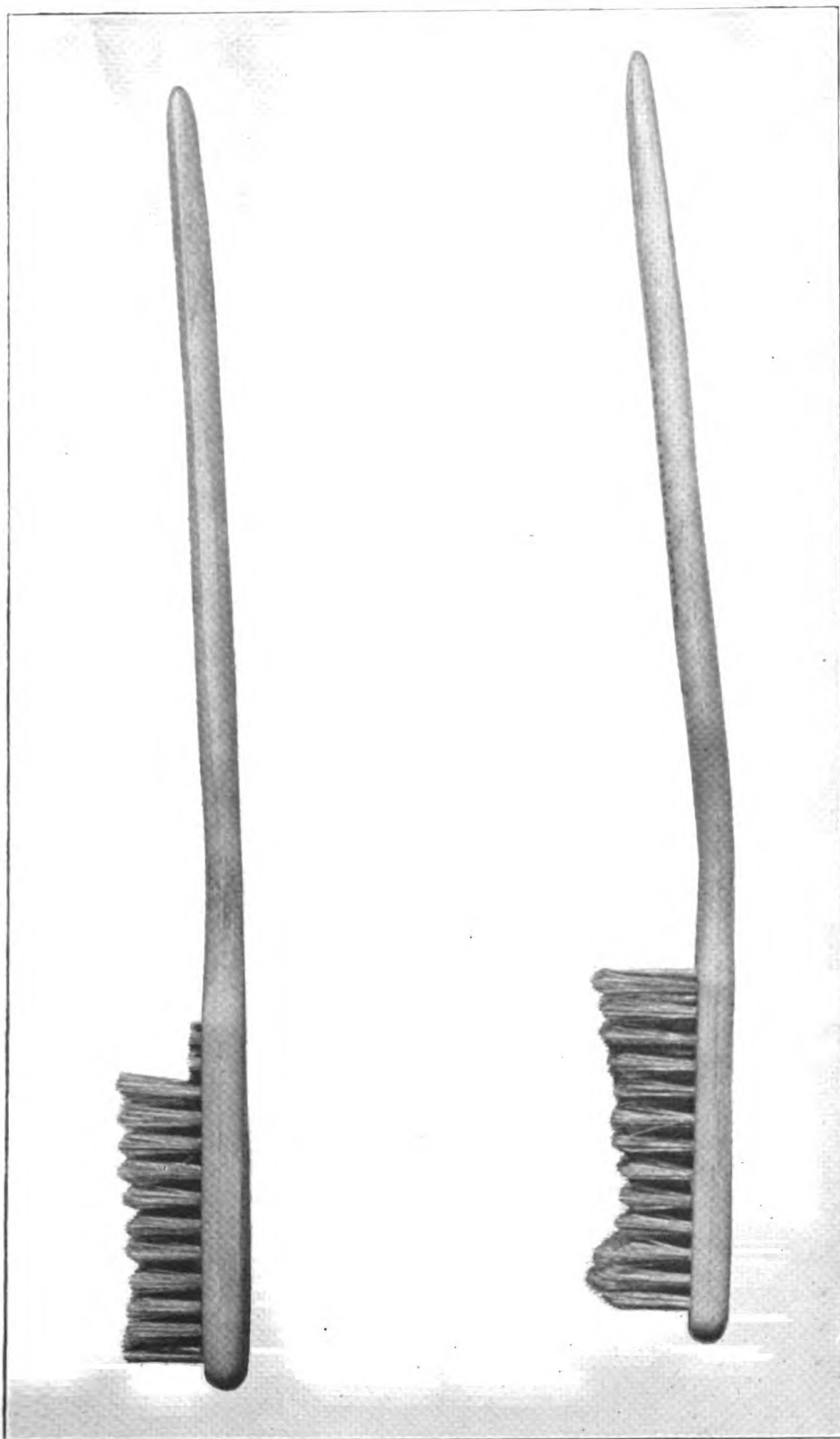
"It is believed that in 90 per cent of cases lack of tissue resistance can be corrected by removing the local causes of irritation and inflammation, that is, by eliminating the most commonly present primary and secondary factors, such as traumatic occlusion and local conditions favoring the collection of débris, detritus, and microorganisms.

"The greatest safeguard to tissue resistance against microorganic infections are high tissue vitality, absence of local irritants, and the reduction of the microorganisms to the fewest possible number."

While it is the dentist's province to remove the local irritants and correct traumatic occlusion, it is incumbent upon the individual to reduce the microorganisms to the fewest possible numbers and to keep the vitality of the tissues as high as possible, and it is here that the correct brushing of the teeth and gums has such an important bearing.

Various types of small brushes are obtainable on the market, but as it is impracticable to have the ship's store carry a special type, the following modification of the prophylactic brush is suggested as a means of obtaining a small brush wherever the latter can be had.

With a pair of small scissors or a knife cut off the six tufts of bristles nearest the handle (two rows of three each) and then lessen the length



THE PROPHYLACTIC TOOTH BRUSH AS PURCHASED AND AS MODIFIED BY TRIMMING THE BRISTLES.

of the end tuft by cutting it almost even with the remainder of the nearest bristles. This gives a brush of about the dimensions recommended by a committee of the American Academy of Periodontology, and one small enough to easily reach all parts of the mouth. This size brush used in connection with the rolling method of brushing the teeth gives an efficient combination for cleansing the teeth, clearing the interdental spaces, and massaging the gums, the latter promoting circulation in the parts.

Perhaps no better instructions can be given than the following quotation: "Use a small brush. Brush the gums and teeth. Be sure and reach both sides of the rearmost molars."

TO BRUSH THE TEETH.

"Place the toothbrush, ends of the bristles up for the upper teeth, between the cheek and the gums; turn the brush toward the gums, sweeping the bristles down over the gums and teeth to the cutting edges of the teeth. Reverse for the lower teeth and brush up.

"This motion brushes the cheek side of all teeth and the tongue side of the back teeth.

"Brush the inside of the front teeth by putting the brush, bristles up, on the roof of the mouth for the upper teeth and on the floor of the mouth for the lower teeth and pulling the brush outward over the gums and teeth.

"Brush the grinding surfaces of the teeth with an in-and-out and side-to-side stroke of the brush.

"Rinse the brush in clear water frequently while brushing the teeth and hang it up to dry when not in use.

"A tooth powder, paste, or a solution of common table salt may be used as a dentifrice once each day. Use clear water at other times."

It is essential that a stiff brush be used and vigorous motions be made, using the forearm. The final brushing may be completed by a light brushing with a long circular motion over all surfaces of the teeth. Dental floss should be used as routine for cleansing spaces under bridges and between the teeth. The final step should be that of taking in the mouth a small quantity of water and with the teeth closed forcing the water with the cheeks and tongue back and forth through the interdental spaces.

TWENTY-EIGHT CASES OF PNEUMONIA.

By J. R. JEFFREY, Lieutenant, Medical Corps, United States Navy.

The pneumonia situation for the winter of 1920-21 at the United States Naval Training Station, San Francisco, Calif., consisted of a mild or small epidemic which extended from January 30 to February 15, during which period 16 cases were admitted. The balance of the cases were sporadic and were admitted in the period from Decem-

ber 25, 1920, to April 2, 1921, with the exception of the cases mentioned above. Considering that the average complement of the station was over 5,000 men this gives an admission rate of less than one-third of 1 per cent for the epidemic period and about one-half of 1 per cent for the entire season.

The 28 cases consisted of 27 lobar pneumonias and 1 broncho-pneumonia. The single case of broncho-pneumonia gave a history of having had duty indoors in the stencil room and of sleeping in a warm room preceding the onset of the disease. All but two of the lobars gave histories of having guard duty, drilling or other outside details, and of sleeping in tents. During the season the weather had been rainy or foggy for a quarter part of the time and very little opportunity was offered for airing bedding or drying out tents. It is surprising that the percentage of pneumonias is so low considering the large number of admissions for acute bronchitis and that two-thirds of the men on the station were recruits and many of them from the warm Southern States.

Although this series of cases is too small to give any except comparative data, some very interesting points have been noted.

Seventy-five per cent of the cases were well prior to the onset of the disease. Three of the cases developed in sick quarters, one 8 days and another 18 days after being admitted with acute bronchitis and one mild case three weeks after being admitted with acute laryngitis.

Thirteen (48 per cent) had involvement of the right lung, 11 (40 per cent) of which were of the lower lobe and 2 (7.5 per cent) were of the lower and middle lobes. Fourteen (52 per cent) were of the left side and only the lower lobe was involved. In none of the cases were both lungs affected.

The following table gives the data as to types:

Lung.	Type I.	Type II.	Type III.	Type IV.	Not typed.	Total.
Right.....	3	2	2	5	1	13
Left.....		1	1	9	2	14
Total.....	3	3	3	14	4	27

Both cases in which two lobes were affected were Type I.

One case had a reinvolvement of the same lobe 14 days after his temperature had reached normal by lysis and ran a typical course with a crisis on the third day.

Three patients had attacks of malaria while convalescing. Two responded readily to quinine treatment, but the third required neoarsphenamin intravenously before the chills were controlled after which he gained very rapidly.

One case of delayed resolution was found that later developed into an abscess which subsequently ruptured and drained through a bronchus. Following the initial rupture he raised a pint and a half of pus within a half hour, which on laboratory examination showed many streptococci and Type I pneumococci.

Nine cases developed suppurative pleurisy, and rib resection was done as soon as the diagnosis was established on eight of them. The ninth case was drained through a silver tube inserted through a stab wound on account of the presence of a pneumothorax. The time of development of the suppurative pleurisy varied from 12 to 23 days after the original admission and from 3 to 10 days after the temperature had reached normal by crisis or lysis. In three cases the temperature did not drop to normal before the complication was diagnosed.

The temperature fell to normal by crisis in 13, and by lysis in 9 cases.

The mortality was three cases (11 per cent). One died of toxemia on the fourth day, the second of acute dilation of the heart on the fifth day of the disease, and the third a suppurative pleurisy with pneumothorax a week after transfer to the Mare Island Hospital and 60 days after the original admission.

In only one case was an albuminuria found and that in the case which subsequently died of toxemia.

One case of chronic pulmonary tuberculosis was discovered 15 days after the patient had been up and about in the ward. He gave a history of tuberculosis in mother and two sisters who had died in the past two years with this disease.

Mitral systolic murmurs were found in two cases, which disappeared after the termination of the pneumonia. One of these was in a case which had had an acute laryngitis for three weeks prior to the onset of the pneumonia and was probably due to a vagus involvement associated with the laryngitis.

Two of the patients did not raise sufficient sputum for typing and even during their convalescence coughed very little.

The leucocyte count varied from 8,000 to 38,500 on admission, and in several the count did not reach 10,000 till after the crisis. Of the seven cases where the count ran above 25,000 on admission and till after the crisis, five developed complications.

The treatment was purely symptomatic. No serum was used. In two cases whisky was used as a stimulant for short periods. Two patients required digitalis for three-day periods. Creosotal minims *X t. i. d.* was used as a routine on the last 10 cases and seemed to give some relief. Dover's powders, codeine, and morphine were given freely where needed to control the coughs and as a hypnotic.

The assembled data are given in the following table:

DATA OF ALL LOBAR PNEUMONIA CASES, WINTER (COOL, WET) SEASON, 1920-1921.

U. S. NAVAL TRAINING STATION, SAN FRANCISCO, CALIF.

Cases	Rate.	Age.	A-RA.	Date.	Lobes involved.	Type.	Admission.			Urine.	W. B. C.	Crisis or lysis.	Complication or associated disease.	Days after admission.	Aspiration.	Operation.	Disposition.	Remarks.
							T.	P.	R.									
1	A. S.	19	A.	Jan. 14, 1921	Rt. L. M.	I.	104	104	22	Neg.	36,000	L-10.	Pleurisy, supp.	13	3	Rib resected.	T-31.	Received from T. S. S. Bath.
2	Cox.	18	R. A.	do.	Lt. L.	IV.	102.5	126	22	Neg.	8,000	C-5.	None.	22			D-25.	R involvement 14 days after lysis.
3	A. S.	18	A.	Jan. 17, 1921	Rt. L.	III.	102.5	86	22	Neg.	45,000	L-8.	Reinvolvement of same lobe after 22 days.	16	1	Rib resected.	D-52.	
4	A. S.-EL. (R).	18	A.	Jan. 20, 1921	Rt. L.	Not typed.	101	102	24	Neg.		L-10.	Pleurisy, supp.				T-25.	Received from receiving ship San Francisco.
5	Bkt-2.	22	R. A.	Dec. 25, 1920	Lt. L.	do.	103	112	24	Neg.	38,500	C-5.	None.				D-38.	Toxicemic death no sputum for typing.
6	A. S.	18	A.	Jan. 30, 1921	Lt. L.		103	94	24	Alb.	12,740						DD-4.	
7	F-3.	18	A.	Jan. 31, 1921	Lt. L.	IV.	102	88	22	Neg.	18,400	C-6.	None.				D-28.	
8	A. S.	18	A.	Feb. 1, 1921	Rt. L.	IV.	102	88	34	Neg.		C-3.	do.				D-28.	
9	F-3.	20	A.	Feb. 4, 1921	Rt. L.	IV.	102	132	33	Neg.							DD-5.	Died of acute dilation of heart.
10	A. S.	21	A.	do.	Rt. L.	II.	103.5	120	22	Neg.	12,600	C-3.	None.				D-25.	Received from receiving ship San Francisco.
11	S. C.-2.	33	R. A.	Feb. 6, 1921	Lt. L.	IV.	101	94	19	Neg.	8,200	C-3.	do.				D-23.	
12	A. S.-Y.	25	A.	Feb. 8, 1921	Rt. L. M.	I.	104	96	24	Neg.	7,300	C-8.	Delayed resolution, malaria abscess of lung.		1		T-52.	
13	A. S.	18	A.	Feb. 9, 1921	Rt. L.	IV.	103	90	24	Neg.	27,700	C-4.	None.				D-21.	Developed mumps eleventh day.
14	A. S.	17	A.	Feb. 10, 1921	Lt. L.	LV.	104	106	28	Neg.	21,500	L-9.	Malaria, pleuritic adhesions.				Conva-lescent.	Pseudocrisis third day.
15	A. S.	23	A.	Feb. 9, 1921	Lt. L.	IV.	103	90	24	Neg.	37,000	C-9.	Mumps, pleurisy supp.	12	2	Rib resected.	T-21.	Silver tube inserted through wound after 41 days.
16	F-3.	21	A.	Feb. 13, 1921	Rt. L.	IV.	102	110	22	Neg.	30,400	C-5.	Pleurisy, supp.	15	2	do.	T-24.	
17	A. S.	19	A.	Feb. 3, 1921	Rt. L.	IV.	104	120	22	Neg.	9,800	No.	Pleurisy, supp. pneumothorax.		4	Draught through stab wound.	T-55.	

18	A. S.....	(17 A.....	Feb. 12, 1921	Lt. L....	II.....	102.....	90.....	24 Neg..	No 1.....	Pleurisy, supp.	21.....	2 Ribresected.	T-27.....
19	Ses-2.....	17 A.....	Feb. 15, 1921	Lt. L....	IV.....	103.5.....	108.....	34 Neg..	C-13.....	do.....	23.....	2 do.....	T-29.....
20	A. S.....	20 A.....	Feb. 6, 1921	Rt. L....	III.....	102.....	108.....	28 Neg..	No 1.....	do.....	15.....	1 do.....	T-24.....
21	A. S.....	17 A.....	Feb. 9, 1921	Lt. L....	IV.....	103.....	98.....	22 Neg..	L-5.....	do.....	12.....	1 do.....	T-21.....
22	A. S.....	18 A.....	Feb. 25, 1921	Lt. L....	Not typed.	100.8.....	70.....	36 Neg..	L-5.....	Laryngitis, valvular disease, chr.	.....	.....	D-31.....
23	A. S.....	21 A.....	Feb. 28, 1921	Lt. L....	III.....	103.5.....	142.....	26 Neg..	L-16.....	cardiac.	.....	1.....	Conva-lescent.
24	A. S.....	18 A.....	Mar. 1, 1921	Rt. L....	I.....	103.5.....	100.....	24 Neg..	C-5.....	.....	.....	.....	D. A. 38
25	A. S.....	20 A.....	Mar. 9, 1921	Lt. L....	IV.....	105.....	115.....	20 Neg..	C-6.....	T. B., chr. pul.	38.....	.....	T-4.....
26	A. S.....	18 A.....	Mar. 17, 1921	Lt. L....	IV.....	103.....	120.....	24 Neg..	L-4.....	Malaria.....	.....	.....	D-37.....
27	S-2.....	19 A.....	Apr. 2, 1921	Rt. L....	II.....	103.....	108.....	30 Neg..	L-12.....	.....	.....	.....	Conva-lescent. D-38.

Temperature had not reached normal when transferred.

Ultimately died at Mare Island.

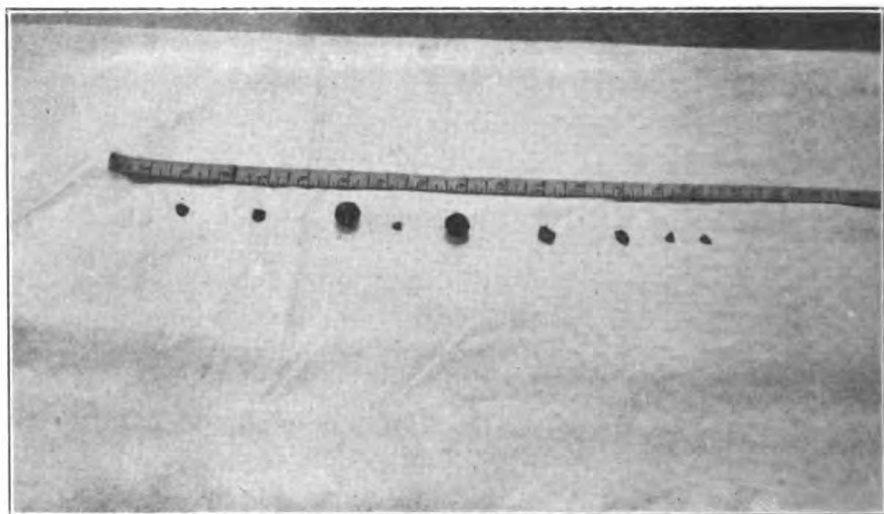
A CASE OF TUBERCULOUS MENINGITIS.

By S. P. TAYLOR, Lieutenant Commander, Medical Corps, United States Navy.

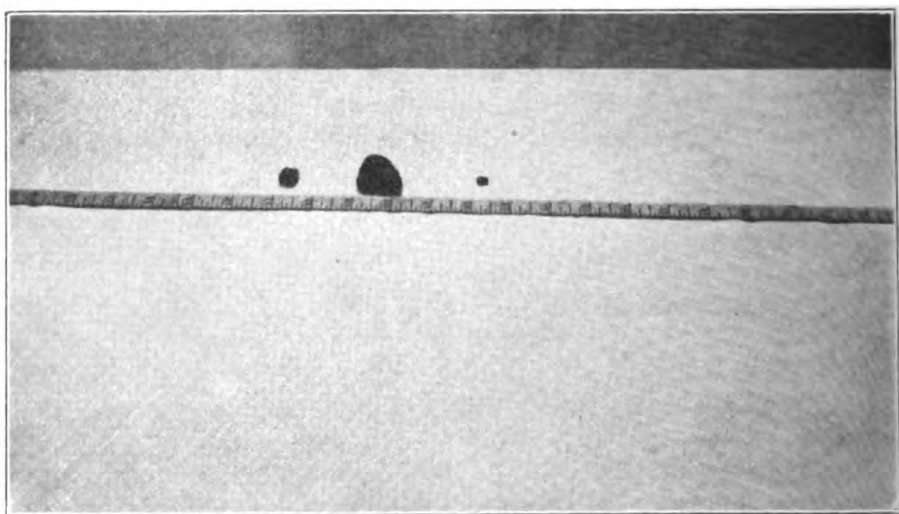
F. R. B., apprentice seaman, U. S. Navy, age 18 years, was admitted to the United States Naval Hospital, Gulfport, Miss., from the main training camp dispensary February 12, 1921. His family history was negative. He had had measles, mumps, smallpox, and malaria in childhood.

Upon admission to the hospital, the patient stated that he had had for the past 10 days a severe orbital and occipital headache. This headache had been getting constantly worse and nothing seemed to give relief. He had projectile vomiting twice in the last three days.

His temperature on admission was 99.6 F., pulse 52, and respiration 20. He had the facial expression of one in severe pain. He was extremely restless, and it was difficult to keep him in bed. His chief complaint was this severe headache. Physical examination showed an alert, fairly well-developed boy eighteen years of age. There was slight stiffness of the neck muscles, and the patella reflexes on both sides were absent. The ocular movements were normal. The pupils were dilated, equal, and reacted to light and accommodation. There was no Kernig, no ankle clonus, and no Babinski. Examination of the heart, lungs, and abdomen revealed no abnormality. The leucocytes in the blood were 12,000 per c. mm., and the urine was negative. Lumbar puncture was performed on admission, and 30 c. c. of clear spinal fluid was removed under slightly increased pressure. Examination of the fluid showed 450 cells per c. mm. The differential count was 94 per cent small lymphocytes, 2 per cent polymorphonuclear, and 6 per cent large mononuclear leucocytes. A stained smear of the spinal fluid was negative for the meningococcus and the tubercle bacillus; 24 and 48 hour cultures of the spinal fluid on blood agar and plain agar were sterile; Pándy, Ross-Jones, and Fehling's reactions were negative. Cerebrospinal fever, cerebrospinal syphilis, tuberculous meningitis, and other secondary forms of meningitis were considered as possibilities. Cerebrospinal fever was eliminated by the high percentage of small lymphocytes in the spinal fluid and the low percentage of polymorphonuclear leucocytes. The meningococcus could not be found in smears of the spinal fluid, and cultures for the meningococcus were negative. The spinal fluid in cerebrospinal fever is apt to be cloudy, and in this case it was perfectly clear. Other forms of meningitis due to pneumococci, etc., are also distinguished by their spinal fluids, which are usually cloudy, and the staining of the spinal fluid will show the infecting organism. The spinal fluid in this case showed no organisms on slides stained with methylene blue, and cultures both on plain agar and blood agar were negative.



GALLSTONES.



RENAL STONES.

Cerebrospinal syphilis was eliminated by a negative Noguchi on the blood and spinal fluid and a normal Lange colloidal gold curve.

Tuberculous meningitis seemed the most probable diagnosis in view of the fact that the spinal fluid was clear, sterile, and the cell count showed 750 cells per c. mm., 94 per cent of which were small lymphocytes. February 14 the patient still complained of headache, the stiffness in the neck increased, and the vomiting recurred. He was semiconscious all day. His temperature was 100 F., pulse 52, respiration 20.

On February 15 there was complete retention of the urine. By lumbar puncture 30 c. c. of spinal fluid was removed under pressure. Examination of this fluid showed 750 cells per c. mm., 92 per cent lymphocytes, 7 per cent polymorphonuclears, and 1 per cent mononuclears. Smears, many of which were made, were negative for the tubercle bacillus. A test tube containing 10 c. c. of the spinal fluid was set aside for 24 hours. The pellicle of fibrin which had formed in the center of it was fished out and spread upon slides which were stained for the tubercle bacillus. Nearly every microscopic field showed two or more tubercle bacilli, which made the diagnosis of tuberculous meningitis, and the case is reported because of the success of this procedure.

The patient steadily failed and died February 19, 1921. Necropsy was performed. On opening the dura a small amount of straw-colored fluid escaped. Upon the pia mater and arachnoid at the base of the brain were many grayish miliary tubercles most numerous along the blood vessels and in the interpeduncular space. The peribronchial lymph glands were enlarged. The lungs showed no evidence of any tuberculous lesions. Many cut sections were made of all the organs, yet no evidence of tuberculosis could be found. Microscopic examinations of the sections from the lungs, bronchial lymph glands, and kidneys showed no evidence of tuberculosis.

CHOLECYSTECTOMY AND PYELOTOMY IN GUAM.

By A. H. ROBNETT, Commander, Medical Corps, United States Navy.

The two following cases occurred in the surgical service of the United States Naval Hospital in Guam.

Case I. Cholecystectomy.—1. B., female, aged 23, married, the mother of five children. She gave a history negative for typhoid, pneumonia, or any other prolonged illness. She had the usual diseases of childhood, since which time her health has been excellent.

For several years at intervals she has had colicky pains in the epigastrium. While pregnant this pain would disappear and did not return until after being delivered. About six months prior to

admission to the hospital she ate some canned oysters for dinner. During the night she awoke with colicky pains in the region of the epigastrium and the right hypochondrium. Shortly after arising the pains disappeared. (The oysters were credited with causing them.) Since that time, often in the early morning hours, she would be awakened with these pains, which disappeared shortly after arising from her bed. A week before admission these colicky pains were present each night and became more severe and persistent. She was put to bed in the hospital on Ochsner's treatment for appendicitis and the day following she felt relieved. Temperature, pulse, and respiration were normal and the white-blood count was 7,600. There was no jaundice. In the evening, after being up nearly all day, the intense pain returned and she was given morphine to relieve it; next morning it was decided to do an exploratory laparotomy at once.

OPERATION.

Right rectus incision. The appendix was found to be very long and bound down by a Jacksonian membrane. The appendix was removed. The ovaries and uterus were normal. The gall bladder was distended and several stones were palpated. The incision was extended. The patient did not take the anæsthetic well, so speed became an element for consideration. As the gallstones were easily returned to the gall bladder, cholecystectomy was decided upon. The neck of the gall bladder was transfixed with double ligatures and the gall bladder, containing four large stones, was removed. A rubber drain was placed at the stump of the gall bladder and the abdomen was closed. There was marked reaction to the operation, the temperature rising to 103 F. for three days. The blood picture remained practically normal. On the fourth day the drain was removed and convalescence was uneventful. She was discharged from the hospital well on the seventeenth day. The gallstones, measuring 1 inch in diameter, were round and too large to be passed through the common duct, but while the patient was in the recumbent position they would fall into the neck of the gall bladder and in this way give rise to the pain coming on after retiring. Upon the patient's arising in the morning, these gallstones would fall to the most dependent part of the gall bladder and thus relieve the pain.

LABORATORY EXAMINATION.

The bile from the gall bladder was negative for microorganisms, and there was no growth on the culture media. Two stones were crushed, culture taken, and penumococcus was found on growth.

The interesting points in this case are: Absence of jaundice; no symptoms of gall-bladder trouble other than pain in abdomen; complicated appendix with Jacksonian membrane; size of the gall-

stones, which would never have been able to pass through the common duct, making their ultimate removal a necessity, and the recurrence of the attacks while in the recumbent position and their disappearance on rising.

Case 2. Pyelotomy.—M. G. T., female, aged 28, married, was four months pregnant (primipara). Her previous medical history revealed scarlet fever, bloody urine, measles, and pertussis during childhood. She had influenza two years ago. In 1913 she began to have pains in the right lumbar region. These pains have continued at intervals ever since. Any shaking, as riding in a cart or automobile, would bring on the pain. During her menstrual periods the pain was more pronounced.

Three weeks before admission to the hospital she had excruciating pain in the right lumbar and iliac regions during the passage of a renal stone to the bladder, it being later voided through the urethra. This stone measured one-fourth inch in thickness and one-half inch in length. She came to the hospital for examination and measurements relating to her pregnancy, mentioned the pains in her right lumbar region, and produced the stone she had passed.

Physical examination showed her to be well nourished, four months pregnant, kidneys palpable. Urine and blood examinations were negative. X-rays showed the right kidney to be very large, with two fair-sized stones in the pelvis. The left kidney was negative. Patient being in good condition, immediate operation was decided upon.

OPERATION.

The extraperitoneal route was chosen. The kidney was delivered outside of the body with difficulty. It was found to be enlarged, but of normal structure, although the capsule was very adherent to the surrounding tissue, making it necessary to strip it to deliver the kidney, causing some local hemorrhage. The stones were located in the pelvis, a longitudinal incision was made in the pelvis of the ureter, the stones were seized with forceps and delivered. They were very large, one being $1\frac{1}{2}$ inches long, 1 inch wide, $\frac{3}{4}$ inch thick. The others were smaller, as shown in the X-ray. The pelvis of the kidney was very much enlarged. The ureteral incision was closed and reinforced with Lembert's stitches. Remnants of the capsule were removed, the kidney was replaced with a drain leading to the pelvis, and the kidney fat sutured. The wound was closed, and on the fourth day the drain was removed, when there was a noted discharge of bloody urine by both bladder and wound. On the sixth day all the urine and the discharge from wound was clear. There was slight reaction to the operation. On the eighteenth day the discharge of urine from the sinus ceased and the wound healed. The patient was allowed to

go to the toilet and to recline in a chair. On the twenty-first day she was discharged cured. The pregnancy was not disturbed.

The interesting points in this case are: The immense size of one of the stones, no apparent damage to the kidney parenchyma, no interference with pregnancy, lack of marked reaction following operation, and the prompt closing of the sinus with lack of any kind of infection.

ELEPHANTIASIS OF THE SCROTUM.

By L. W. BREENE, Lieutenant, Medical Corps, United States Navy,¹ and W. ZUR LINDEN, Chief Pharmacist, United States Navy.²

During November, 1920, while cruising in the West Indies, the U. S. S. *New Hampshire* visited the small port of Gonaives, Haiti, where the medical officer was asked by the sanitary officer of the port to see some cases in the civil hospital and in the Gendarmerie prison. The patient, who is the subject of this report, a prisoner, had an immense enlargement of the scrotum which hindered his walking. He was a negro, very ignorant, and apparently about 45 years of age. He was greatly emaciated, probably from lack of sufficient food. He was much depressed and had twice attempted suicide.

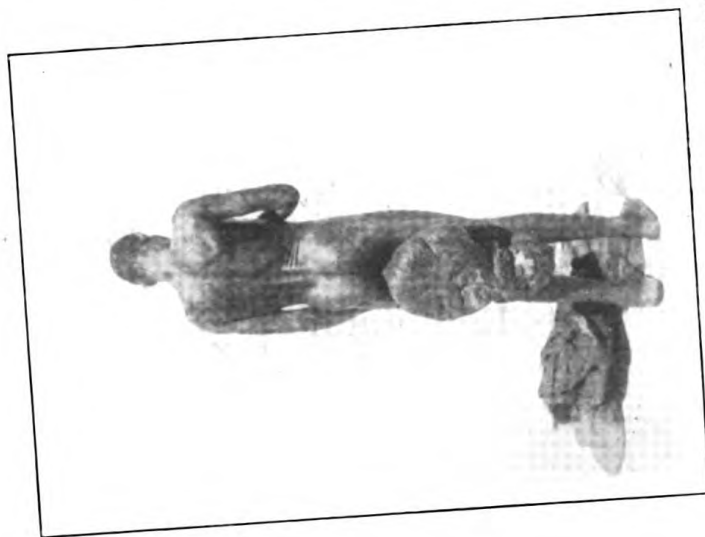
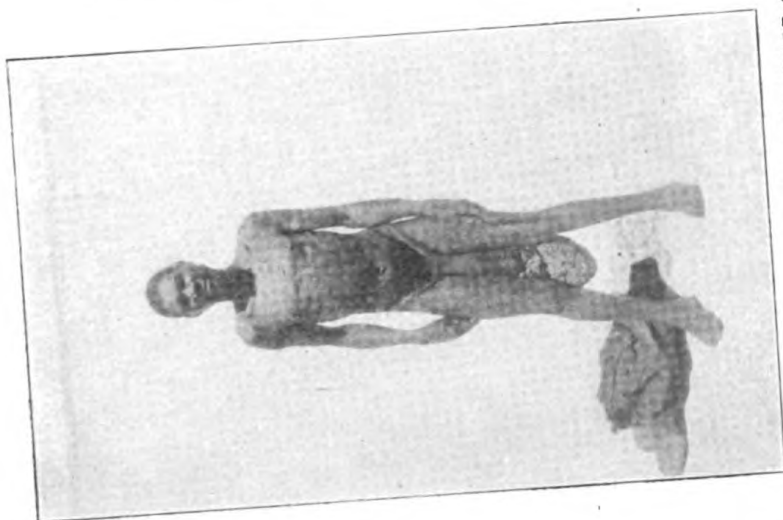
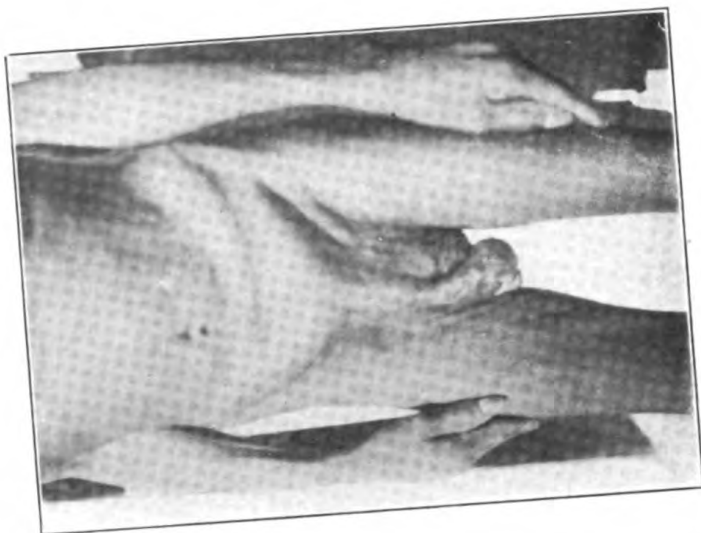
No reliable history of his condition could be obtained. He told us that about 25 years ago he was bitten on the scrotum by an insect, and he dates his trouble from that event. The enlarged scrotum was estimated to weigh 50 pounds. The accompanying illustrations make detailed description superfluous. Urine was voided through an ulcerated aperture opening anteriorly. Operation was performed under ether.

A tourniquet was placed around the mass, as close to the base as possible; a dorsal slit was then made down to the penis. That organ was found intact and normal except for the fact that it was 15 inches in length, caused by prolonged tension due to the weight of the mass. The right testical was normal, but the left was atrophied and contained a hydrocele. It was removed. Bleeding was severe and troublesome in spite of the tourniquet. All of the hypertrophied cellular tissue possible was removed, and then, by a series of circular sutures, the penis was reduced to about 8 inches in length, and covered with skin. Hemorrhage was controlled, and the patient left the table in good condition.

He voided urine in the dressing during the night, and the next day he used the urinal. The recovery was a stormy one. Infection set in about the fourth day and proved to be most difficult to combat. Recovery was complete after three months; and the man is now able to assume a useful occupation.

¹ Medical officer, U. S. S. *New Hampshire*.

² Sanitary officer, Gonaives, Haiti.



ELEPHANTIASIS OF SCROTUM. BEFORE AND AFTER OPERATION.

RULES FOR MASSAGE.

By W. S. BAINBRIDGE, Commander, Medical Corps, United States Naval Reserve Force.

In a special number of the UNITED STATES NAVAL MEDICAL BULLETIN published in January, 1919, certain directions for massage, devised by Captain W. H. BROOD, R. A. M. C., in charge of the massage and gymnast departments of the Alder-Hey Hospital, Liverpool, England, were printed. These rules for massage had proved so useful and were so admirably explicit, for those beginning work in physiotherapy as well as those familiar with the procedure of that branch of treatment, that it seemed at that time that a copy of them put into the hands of all our nurses and aids employed in this work would be a distinct advantage. Many requests for these rules have been received, and as the special number in which they appeared is now out of print it is believed that a reprinting of them might be acceptable to the readers of the BULLETIN.

Preliminary.—It is essential in every case for which massage is ordered that the masseur or masseuse, to whom the work is intrusted, should have a clear knowledge of the nature and extent of the injury, and also of the methods by which recovery is to be obtained. This is especially necessary in orthopedic cases. Consequently, an examination of the patient is made by the officer in charge of the massage department in the presence of the masseur or masseuse who is to undertake the case. A history of the case is taken on this occasion, with a detailed description of the present condition, movements, electrical reactions, and angles of affected joints. The X-ray photographs should also be examined when they are available, and the nature and object of any operation that may have been performed should be understood.

The officer in charge then suggests the particular massage movements suitable for the case, and, where joints are involved, the extent and degree of manipulation advisable. Any abnormal condition of a patient occurring during treatment should be reported immediately to the officer in charge.

After the orthopedic surgeon has effected structural repairs or alterations, it is massage which can assist in restoring function as far as restoration is possible.

It is a privilege to have the opportunity of assisting in this restoration to health, activity, and usefulness of our wounded soldiers. The massage department of a military orthopedic hospital presents this opportunity as perhaps no other does; therefore, let the treatment and progress of each case be regarded with the keenest personal interest.

Lubricants.—Effective massage is impossible in the majority of cases without the use of a lubricant. The object of a lubricant is to make manipulation easy, to prevent chafing of the skin, or dragging of hairs. What lubricant is used is immaterial as long as this object is attained. The slightest chafing or bruising of the patient's skin during treatment is inexcusable and is evidence of faulty technique. Ordinarily French chalk or one of the talcum preparations is used, but where there is a considerable growth of hair, trophic changes, or an unusually dry skin an oily material, such as olive oil or white vaseline, is indicated. The virtue of massage lies not in the lubricant but in the manual dexterity employed.

Muscle cases.—It is essential that a paralyzed limb should not be allowed to lie in a position in which the affected muscles are stretched, allowing the undisputed antagonism and possible contraction of the opposing healthy muscles. A normal, healthy muscle, even when at rest, is in a condition of slight contraction in order to respond instantly to an impulse. This condition of "tone" is absent in a paralyzed muscle. Paralyzed and weak muscles are kept from being stretched and elongated by a support applied to the affected limb. For example, a hyperextension wrist splint is worn in a case of musculo-spiral paralysis, a rectangular foot splint where the flexors of the ankle are weak, and abduction shoulder splint for a paralyzed deltoid muscle. The necessary massage can often be done in these cases without removing the supporting splint, but when its removal is essential the limb must instantly be passively supported by a pillow or sandbag as the splint is withdrawn to prevent any stretching of the affected muscles.

Heavy tapôtment, or percussion, movements should never be performed upon paralyzed or wasted muscles, as the attenuated muscles and weak nerves are easily injured. The gentlest petrissage, or muscle kneading, should be used, increasing in vigor as recovery proceeds.

Petrissage is best performed with the muscles or group of muscles in a relaxed and supported position. To illustrate this, when working upon the extensors of the forearm, the patient's wrist should be "dorsi-flexed," with hand and fingers supported on a sandbag to secure relaxation of the muscles. In the case of the flexors of the forearm the hand must be "palmar-flexed" to secure similar relaxation. Relaxation of the quadriceps may be procured by placing a large pillow or sandbag behind the knee. A similar pillow will also be found useful to secure semiabduction or semiadduction of the various joints where muscular relaxation is required.

Joint cases.—All passive movements should be performed by firmly grasping the limb just above and just below the joint. The necessary movements are made slowly, gradually, once only, and up to a point just short of giving pain.

Body weight will assist to immobilize the pelvis while the hip joint is moved.

Force is sometimes required to obtain additional movement of a joint, but should only be used when especially ordered by the officer in charge.

Pain, heat, swelling.—Any abnormal condition occurring in a joint, such as pain, heat, or swelling, should be immediately reported.

Bandages or splints which have been removed during massage should be carefully replaced in the same manner and position as worn before.

Bone cases.—When massaging cases of fracture, bone grafting, or other condition producing callus, depletion movements should be employed to empty the main veins and lymphatic vessels, especially in that portion of the limb which is distal to the graft or fracture. Increased vascularization and consequently improved nutrition, essential to repair, will thus be promoted.

Tendon transplantation cases.—Encourage active rather than perform passive movements of the particular muscles upon which operations have been performed. Apply careful petrissage to the transplanted muscle and friction massage along the new course of the tendons to prevent adhesions. It is essential that these newly transplanted muscles and tendons should not be stretched until they are able to perform their new functions. Similar precautions must be taken in the handling of these cases as with paralyzed or weakened muscles (see muscle cases).

Functional cases.—Massage of these cases should be accompanied by moral and mental suasion. The patient should be encouraged to think hopefully of his recovery, and be interested in his future possibilities. Try to convince him

of the importance of making a real effort to use the functionally weak muscles, and the serious results if he neglects to use them.

Massage before operation—Diagnostic massage.—A course of massage is frequently ordered for cases before operation for bone grafting, tendon transplantation, or nerve suture in which there is old scar tissue near the site of operation. Moderately vigorous kneading should be applied to any fibrous thickening or scar tissue to liberate any latent infection which may possibly be lurking in it, which, if undiscovered before operation, would retard or prevent its success.

Note making.—When making the weekly or fortnightly notes on the clinical progress of a case, vague generalities should be avoided, such as "patient seems better," or "arm improved," and the like. Incorporate in a sentence or two a tangible, clear, and concise statement bearing on the progress of the case in the direction of the main object of treatment.

Examples.—The girth of the thigh muscles has increased 1 inch.

The left quadriceps reacts well, with the exception of the vastus internus, which is lacking in tone and substance, as compared with the right.

The extensors of the toes show faint voluntary contraction this day, June 1, 1917.

Cutaneous sensibility noted over whole dorsum of hand.

Fingers of the right hand are now of the same color and temperature as those of the left hand.

Active flexion at the elbow is obtained to an angle of 90°, passive flexion to 100°, etc.

Nerve cases.—The lesion may be partial or complete.

(A) *Muscles.* Note the complete (paralysis), or partial (paresis) absence of muscular activity, stating the particular muscle or groups of muscles affected.

(B) *Skin.*—1. Cutaneous sensibility. Note the areas of the loss of cutaneous sensibility. This is done with a camel's-hair brush or with cotton wool. The patient's eyes should be closed or bandaged while the tests are made.

2. *Trophic conditions.* Note the condition of the skin, and state any trophic conditions, whether dull, shiny, or scaly, the presence of any trophic ulcers, etc.

3. *Color and temperature.* Describe the color and temperature as compared with the corresponding sound limb, and state whether ischemia or cyanosis is present.

4. *Return of power and sensibility.* After all nerve operations note the date of return of sensation to a previously insensitive portion of the skin, or return of voluntary power in a paralyzed muscle.

5. *Electrical reactions.* The electrical reactions in nerve cases are periodically examined. Inquire of the officer in charge the results of these examinations.

MUSCLE CASES.

1. *Measurements.*—Frequently take the measurement of the circumference of limbs under:

Thigh.—Seven inches above the upper border of patella.

Calf.—Six inches below the upper border of patella.

Upper arm.—Six inches above the tip of olecranon process.

Forearm.—Four inches below the tip of olecranon process.

2. *Muscular tone.*—Describe the condition of the muscles with regard to the degree of resilience, firmness, and tone, i. e., their prompt response to a voluntary stimulus, and compare the amount of contraction with the corresponding sound muscle or group of muscles.

Note the absence or presence of spasm or tremor.

To test the power of grip use the dynamometer frequently and record the readings.

JOINT CASES.

1. *Freedom of movement.*—State whether the movements are free, and, if not, whether accompanied by creaking, grating, or clicking. Also, note if the joint is swollen or not. In the event of a click being detected, state at which particular position of the joint it occurs.

2. *Range of movement.*—Measure the range of movement in the joint which is under treatment at intervals of a fortnight. The anglemeter is used for testing the degree of movement in the shoulder, elbow, wrist, knee, and ankle. State whether the degree of movement obtained is active or passive.

In the case of fingers or toes state whether one-fourth, one-half, three-fourths, or full normal flexion or extension is obtained.

Ischemic hands and feet and trench feet.—Describe the color, temperature, amount of movement, and degree of pain compared with the corresponding hand or foot.

Any sign of retrogression should be noted at once.

Exercises.—When massaging a limb it is essential to perform full movements at the several joints.

In proportion to the amount of movement at the joints and the muscular condition of the limb, the exercise should, in the early stages, be passive in character; as improvement advances active movements should be practiced and later movements with resistance.

In this way a gradual sequence of passive, active, and resisted movements of the joints accompanies the increased range of movement and improved muscular power.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Commander E. U. READ, Medical Corps, United States Navy.
Lieutenant Commander C. W. O. BUNKER, Medical Corps, United States Navy.
Lieutenant Commander G. F. CLARK, Medical Corps, United States Navy.
Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.
Lieutenant Commander J. J. O'MALLEY, Medical Corps, United States Navy.
Lieutenant Commander H. E. HARVEY, Dental Corps, United States Navy.

GENERAL MEDICINE.

RAVDIN, I. S., and GLENN, E. The transfusion of blood with report of 186 transfusions. *Am. Jour. Med. Sc.*, May, 1921.

The authors review the history of blood transfusion, discuss its indications, the amount to be transfused, the selection of donors, and describe the method employed in the hospital of the University of Pennsylvania.

They have found the indications divisible into three groups:

I. *Loss of blood*.—To this group belong all those cases of anemia from acute hemorrhage as well as those cases due to small, long-continued blood losses. Some of the latter, however, finally fall into the second group.

II. *Diseased blood*.—Transfusion for this group serves the following functions:

1. To stimulate hematopoietic function.
2. To increase coagulability.
3. To add to the oxygen-carrying capacity.
4. To increase the bactericidal or antitoxic properties of the blood.
5. To increase the general nutrition.

III. *Shock*.—The amount of blood to be transfused depends upon two factors—the indication and the receiving capacity of the recipient. The latter depends upon the condition and size of the patient.

“In cases of severe acute hemorrhage transfusions of large amounts of blood are indicated. We have given as much as 2,100 c. c. in a period of 12 hours. This amount is often difficult to obtain, but 1,000 c. c. can be taken from a donor in good physical condition without any risk. In cases of secondary, primary pernicious, or aplastic anemia we usually use 500 c. c., although if the transfusions are not at very frequent intervals we use 750 c. c. In primary pernicious anemia if the blood count is fairly high and the trans-

fusion is given to stimulate blood formation small transfusions as 250 c. c. are as efficacious as larger ones. In hemophilia 250 to 500 c. c. are sufficient. In melena the size of the transfusion varies from 10 to 100 c. c. Whole blood is most frequently given intramuscularly in this condition."

The fate of the transfused blood has recently been determined by Ashby. He sums up his conclusions by saying: "The life of the transfused corpuscle is long; it has been found to extend for 30 days or more. The beneficial results of transfusion are without doubt not due primarily to a stimulating effect on the bone marrow, but, it is reasonable to assume, to the functioning of the transfused corpuscles.

"In choosing donors for the transfusion three laboratory tests are necessary: The Wassermann reaction, a blood count, and typing. In an emergency the first two may be omitted, but under no circumstances the last. The donor should be a robust young adult, with a negative Wassermann reaction and negative venereal history, and a blood count that is high normal. He must be either in the same type group as the recipient or in Group IV.

"The interaction of the donor's and recipient's cells and serum may be determined by the crossed hemolysis tests, and these tests must be carried out in all cases where the type reading is doubtful. The simple typing with known sera has proved so satisfactory, if accurately done, that only in few cases have we used any other methods for determining the suitability of a donor's blood. The method of Vincent, based on the grouping of Moss, is the one which has been used in most of our cases. A drop of known Type II serum is placed on one end of a clean slide and a drop of known Type III serum on the other end. One drop of the patient's blood is then mixed with each drop of serum. The slide is rocked from side to side gently for five minutes and then examined for agglutination. The type is determined by the following table:

Serum.....	I	II	III	IV
Group I	—	—	—	—
Group II	+	—	+	—
Group III.....	+	+	—	—
Group IV.....	+	+	+	—

"Moss has found in extensive observations that agglutination frequently occurs without hemolysis, but that hemolysis is always associated with or preceded by agglutination. If crossed hemolysis is done we use a modification of Rous' method of testing donor's blood

for transfusion. Take two small test tubes (1 by 5 cm.); in each place four drops of the following citrate solution:

Sodium citrate	-----gm--	1.5
Sodium chloride	-----gm--	0.9
Distilled water	-----c. c.--	100.0

"In one tube collect from the finger or ear one drop of the donor's blood and nine drops of the recipient's blood; in the other tube one drop of the recipient's blood and nine drops of the donor's blood. Mix by shaking. Allow to stand for 15 minutes. Take out a drop from each tube and place on a slide. Add a large drop of normal salt solution without mixing. Cover and examine under the microscope for agglutination. If desired, two drops of citrate solution and one drop of blood may be mixed in a third tube, as a control.

"If there is no agglutination in any mixture, the transfusion is safe. If clumping is present in the tube containing nine drops of recipient's blood and one of the donor's, the recipient's blood agglutinates and may hemolyze the donor's blood and transfusion is dangerous. If clumping is present in the tube containing nine drops of donor's blood and one of recipient's it indicates that the donor's plasma agglutinates the recipient's cells. Transfusion under these circumstances is permissible, since the donor's plasma is so diluted as to have little hemolytic power, but it is less desirable than where no agglutination is present.

"The method used at the university hospital is as follows:

"After a donor has been selected he is placed on an ordinary operating-room table. The selection of the arm to be used depends upon the donor's choice and upon the suitability of the veins for use. The arm is extended and placed on a small table. The site is cleansed with a 95 per cent solution of alcohol and then painted with a 5 per cent solution of picric acid. A tourniquet is applied and sterile sheets are placed so as to surround the operative field.

"A short length, large caliber aspirating needle is used to remove the blood. We find this as efficient as any special needle designed for this purpose, and the cost is considerably less. The needle is inserted into the vein against the current and the blood is collected in a suitable Erlenmeyer flask, which at the start contains one-half of the total amount of sterile sodium citrate solution to be used. We use enough of a 2.5 per cent solution to make the end result 0.25 per cent. While the blood flows into the flask the remainder of the citrate is dropped in with it by means of an ordinary pipette. The flask should be gently shaken during the collection of the blood.

"After the blood is collected the tourniquet is loosened and the needle removed. A small pressure bandage is applied. The flask containing the blood is inverted three or four times and then placed in a basin of water the temperature of which is 120 F.

"The recipient's arm is prepared in a similar manner, a tourniquet is applied, and if the vein is of sufficient size to allow it, a needle is used to introduce the blood. If the vein is not large enough it is necessary to cut down on it and insert a glass cannula. This is, of course, less desirable where repeated transfusions are necessary because it destroys the vein for further use below this point. The skin is first infiltrated with a sterile solution of 0.5 per cent novocain. The incision in the skin seldom needs to be longer than 1.5 cm. The vein is isolated by blunt dissection with a mosquito hemostat, which is then inserted under the vein to carry the catgut ligature. The vein is tied off at its distal end while the ligature at the upper end is merely looped. Sharp-pointed scissors are used to nick the vein in an oblique direction. A mosquito hemostat is applied to either side and to the apex of the triangular nick. While this is being done the assistant holds the proximal ligature taut so as to prevent unnecessary bleeding. The blood is introduced by gravity. A 250 c. c. cylinder containing a small amount of normal sodium chloride at 100 F., is used. The cannula is inserted into the vein in the direction of the flow as soon as all air has been excluded from the apparatus and the flow of saline is established. The tourniquet is now removed. The blood is poured into the cylinder, being filtered through several layers of gauze which have been placed over the top of the cylinder. Even though the blood has been typed and a crossed hemolysis has been done we stop the flow after the introduction of the first 25 c. c. to see if any immediate reaction occurs. If there is any reaction at this time the transfusion is stopped. The blood in the cylinder should be at a temperature of 110 F. and this may be accomplished by keeping the flask in a basin of water at 120 F.

"After the blood has been introduced we again run in a small amount of sterile normal saline. The upper ligature on the vein is tied as the cannula is removed. The skin incision usually needs but one vertical mattress suture. In women accustomed to wearing short sleeves it is preferable to use the internal saphenous vein. This can be used for repeated transfusions, especially if the first incision is just above the internal malleolus.

"When the vein is of sufficient size the same type of needle is used as that used in withdrawing the blood from the donor. It is inserted in the direction of the blood current. After the apparatus is prepared as above it is connected with the needle by a connecting piece."

The symptoms of incompatibility are: (1) Dyspnea, (2) pain in the back, (3) abdominal discomfort and even pain associated with nausea and vomiting, (4) dilatation of the pupils, (5) sweating and flushing of the skin, (6) vertigo and throbbing headache, (7) puffi-

ness of the face and eyelids. Febrile reactions, urticaria, or annoying itching may follow transfusion.

The authors record the following conclusions:

1. With the element of risk practically eliminated blood transfusion has become one of the most effective procedures in modern therapeutics.
2. Transfusion is a specific in acute hemorrhage where the "limit of bleeding" has not been reached, in malena, and in the hemorrhage of hemophilia.
3. It is of definite value in primary pernicious anemia in hastening and prolonging remissions. It is indicated in cases of severe secondary anemia. After transfusion, operations on debilitated or anemic individuals may often be safely undertaken that otherwise would involve serious risk.
4. Transfusion in shock is not as efficacious as in cases of shock associated with hemorrhage.
5. We have not been able to prove the value of transfusion in acute infections, but in chronic infections we have had results justifying its use.
6. Transfusion is of unproved value in acute leukemia. In aplastic anemia it is at the most a temporizing procedure.
7. The difference, as far as reactions are concerned, between the citrate method and the Kimpton-Brown method we have found to be practically nil, and the simplicity of the former warrants its preference. (W. M. K.)

LEMAN I. I. Diabetes mellitus in the Negro race. South. Med. Jour., July, 1921.

It was formerly supposed that diabetes was rare in the Negro race, but from a study of the admissions to the charity hospital from 1898-1909, the occurrence of this disease among them was relatively high. The whites showed an incidence of 0.72 per thousand against 0.47 per thousand for the Negroes. The Negroes furnished 40 per cent of the admissions and 30 per cent of the diabetics.

Studying the admissions for the next 10 years, 1910-1919, shows that the remarkable increase in this disease has fallen upon both races with practically equal force.

Again the Negroes have been 43 per cent of the admissions and have furnished 30 per cent of the diabetes as contrasted with 40 per cent of the admissions and 30 per cent of the diabetes in the former period. The total incidence of diabetes has risen from 64 cases in 101,565 admissions in the first period to 194 cases in 160,044 admissions in the second period. This represents an increase from 0.63 per thousand in 1898-1909 to 1.2 per thousand in 1910-1919, or an increase of 90 per cent. The incidence among the whites rose from 0.72 per thousand to 1.4 per thousand, or 94 per cent; that among the Negroes rose from 0.47 per thousand to 0.86 per thousand, or 83 per cent.

Hence, it is fair to say that whatever influences have contributed to the increase of diabetes, noted by Joslin and other observers, have

affected white and Negro alike, and the latter has shown no especial immunity to the operation of their forces.

The wealth of material of syphilis in charity hospital makes it worth while to analyze these figures from this point of view. Warthin considers that syphilis plays an important rôle in the production of diabetes. He has written that:

"Diabetes may be associated with the more marked degrees of syphilitic pancreatitis; and in our autopsy service all of our diabetic cases have been so associated; but that a number of cases of syphilitic pancreatitis of similar degree of severity have not presented the clinical symptoms of diabetes. It seems very probable, therefore, that latent syphilis is the chief factor in the production of the form of pancreatitis most frequently associated with diabetes, but that diabetes is not always associated with severe degrees of this type of pancreatitis."

If this contention be correct, we should find diabetes more common where syphilis is more prevalent. The syphilization of the Negroes is a matter of common notice and its importance is not difficult to prove from the occurrence of conditions which find their basis in syphilis. But diabetes is not more but less common among the Negroes than among the whites. The Negro portion of the admissions is roughly 40 per cent, the Negro portion of diabetes is 30 per cent, but the Negro portion of such diseases as syphilitic iritis, gumma of the brain, gumma of the liver, aneurism of the aorta, is 60 and 70 per cent. The Negro portion of all cases of acquired syphilis is 56 per cent and of congenital syphilis is 52 per cent.

If syphilitic pancreatitis is the chief or even a frequent factor in the production of diabetes, it is strange that we do not see an abundance of diabetes in the Negro services of the charity hospital which are so rich in other luetic phenomena.

It is fair, I think, to conclude that syphilis is playing no important part in producing diabetes. This, however, is very different from saying that syphilitic pancreatitis does not at times produce diabetes.

Attention has been drawn time and time again to the effect of nervous influences in the production of diabetes. Nervous strain, intense application to business, mental shock, and worry have frequently seemed to play an important rôle, at least, in precipitating the phenomena of the disease or aggravating it. The Negro race is to a very great degree free from these influences. The average individual is happy-go-lucky, living from hand to mouth and from day to day, without great responsibilities and without great ambitions which carry with them great cares. I do not mean that the race is without the finer sensibilities, but that its nervous burden is light and its nervous toll is small aside from the ravages of lues. The mental and

nervous make-up of the Negro is in marked contrast to that of the Jews, among whom diabetes is disproportionately frequent. (J. J. O'M.)

JOHNSON, J. P. The Diagnosis of Syphilis in malarial subjects by the Wassermann reaction. Jour. Path. and Bacteriol., April, 1921.

This investigation was conducted by the use of (1) the original Wassermann method, (2) Tschernogobouw's modification, (3) Fleming's modification, (4) Hecht-Fleming method on each serum, in separate laboratories with independent workers. The sera were obtained from 19 cases where the blood was taken during or shortly after rigor; from 45 cases with no record of rigor but where the first specimen collected had parasites present in the blood, 10 cases in whom parasites were not found in the first specimen but were subsequently found during relapses. All cases received 20 to 30 grains of quinine per day. Seven hundred and thirty-eight tests were made, averaging 10 tests per case.

AUTHOR'S CONCLUSIONS.

The conflicting opinions published in regard to the Wassermann reactions in malaria may therefore arise from the variable conditions under which the Wassermann test is carried out, and emphasizes the need for standardization and the adoption of retesting in all cases in which one positive result is obtained unless such case is clinically syphilis. It does not appear unreasonable to assume that the small number of cases in this series in which the Wassermann reaction was positive on retesting (7 per cent) were cases of latent syphilis. This investigation indicates that the blood in active benign tertian, malignant subtertian, and mixed (B. T.+M. T.) malaria does not give a positive Wassermann reaction. Positive reactions are due to syphilitic infection, or to certain causes connected with the technique employed or to nonspecific changes in the patient's serum as yet not completely understood. In such cases the serum should be invariably retested after an interval. A positive reaction confirmed by a subsequent test is evidence of syphilitic infection. (G. F. C.)

OSBORNE O. T. So-called diseases of the blood. New York Med. Jour., May 18, 1921.

We can not properly recognize or treat disturbances of the blood without a good understanding of its physiology as well as its pathology; therefore, before discussing the diseases of the blood, the author of this paper recalls a few important physiological facts.

Red bone marrow produces the red blood cells. In normal conditions and in health the red cells have no nuclei, although nucleated reds appear in the blood in certain diseases and in emergencies.

When there is a great demand for red cells and the bone marrow is stimulated to an extra production, so-called reticulated cells appear in the blood. This stimulation seems to occur when large numbers of red cells have been destroyed, or after hemorrhage, but this rapid new production of red cells by the bone marrow seems to be inhibited if too large transfusions of blood are given.

The polynuclear leucocytes are produced in the bone marrow. The mononuclear cells, termed lymphocytes, are of two varieties, the large representing about 3 per cent of the total leucocytes, and the small representing about 25 per cent of the total leucocytes. These cells are produced by the lymphatic tissues and glands.

The hydrogen-ion concentration of the blood should approximate $pH=7.4$, and the blood should be slightly alkaline to litmus. Any marked variation from this amount of the hydrogen-ion concentration causes symptoms, and if an acidosis occurs there is profound intoxication and coma. Any disease that diminishes the number of red-blood corpuscles diminishes the alkalinity of the blood. The condition of acidosis most frequently occurs in serious diabetes, but any secondary anemia or deprivation of food will decrease the alkalinity. Also the hydrogen-ion concentration may be decreased when the body is fighting serious infection, and especially if the patient is not receiving a sufficient amount of carbohydrates.

The specific gravity of the blood may have a normal range from 1.04 to 1.07. If the specific gravity is much below this limit, destruction of red blood cells can occur, and edemas and all the symptoms of poor circulation develop. If the specific gravity is much above this limit, disturbances from the increased viscosity occur, with a tendency to phlebitis.

About 14 per cent of human blood consists of hemoglobin, and 96 per cent of the hemoglobin is globin and 4 per cent is hematin, and it is the hematin that contains the iron, about 0.4 of 1 per cent.

Late investigations seem to show that not more than one-twentieth of the body weight is blood. The weight of tissue that is constantly in motion in the adult emphasizes the importance of keeping him in a horizontal position if he is in a weakened condition. Roughly estimated about one-fourth of the blood is in the heart and large vessels, one-fourth in the liver, one-fourth in the muscles, and the remaining fourth is distributed among the various internal organs. We may vary the amount of blood in different parts of the body by position, by moist and dry heat, and by cold applications, a fact of advantage in treating abnormal conditions. The amount of blood that can be lost by hemorrhage without being fatal is very great, provided that the loss is stopped and suitable fluids are rapidly given intravenously. It is not absolutely necessary that the fluid administered should be blood. Physiologic saline, or, better, Ring-

er's solution or Locke's solution, containing 5 or 10 per cent of gum acacia, may be as efficient as an injection of pure or citrated blood.

The blood platelets emanate from the red bone marrow and their number varies in different conditions. Normally they are thought to be about 250,000 to the cubic millimeter. They are diminished in pernicious anemia, in most cases of lymphatic leucemia, and in some cases of myeloid leucemia.

They are greatly reduced in purpura hemorrhagica, which seems to be due to an inability of the bone marrow to produce blood platelets or, possibly, to some condition of the blood which destroys them.

The function of the spleen seems to be to produce leucocytes and lymphocytes and to destroy or at least be a storehouse for broken-down red corpuscles. Associated with the liver and bone marrow, it has something to do with the production of hemoglobin. All of these functions may be assumed by other organs when the spleen has been removed. The spleen also seems to produce or to encourage the activity of phagocytic leucocytes, as during infection it becomes hypertrophied.

Banti's disease may not be a clinical entity, but a manifestation of visceral syphilis. Several observers believe that in this disease the enlargement of the spleen, with later disturbance of the liver and ascites, is due to syphilis.

Acute aplastic anemia differs from pernicious anemia in that there is no blood destruction, but the bone marrow is so diseased that it can not produce blood cells. It may follow a mild infection and emphasizes the importance of seeking and eradicating all foci of infection as soon as any form of anemia occurs.

Acute anemia caused by hemorrhage in sufficient amount to require transfusion is best treated by the intravenous injection of 5 to 10 per cent acacia in Locke's or Ringer's solution.

Secondary anemias can only be improved by treating the cause, which may be anything from a cancer or tuberculosis cachexia to a chronic focal infection, a chronic purulent discharge, an albuminuria, persistent small hemorrhages, or to underfeeding.

Chlorosis is probably caused by a failure to function on the part of one of the endocrine glands. It is almost always associated with amenorrhea, frequently with subthyroid secretion, and often with insufficient ovarian secretion.

Pernicious anemia is caused by a disturbance in the blood marrow and is probably due to an infection. A large number of cases are associated with infection in the mouth; others have been associated with intestinal parasites. There is a diminution of the hydrochloric acid secretion in the stomach and always more or less putrefaction in the intestines, and the liver is impaired. The treatment is summed up as follows: If a Wassermann test is positive, administer arsphe-

namine. Remove all intestinal parasites and focal infections. Prevent putrefaction in the colon. Administer hydrochloric acid, small amounts of iron, and not infrequently a small daily dose of thyroid and a fair daily dose of suprarenal. The suprarenals are generally insufficient in any infection and in all chronic disability. The rest of the treatment consists of sunlight, fresh air, good food, and perhaps heliotherapy.

All that has been said in regard to infections being the cause of pernicious anemia is equally applicable to the leucemias.

Hodgkin's disease is due to an infection, and the lymph glands first to enlarge are those nearest the point where the infection has entered. (W. M. K.)

DE BRUN, H. S. *Singultus*. New York Med. Jour., June 1, 1921.

A symptom which has come prominently to the attention of the physician in the past two years is singultus or hiccough. Singultus is a reflex irritation of a complex nature with afferent impulses to the respiratory center and efferent impulses carried through the phrenics to the diaphragm. Hence there is a clonic spasm of that muscle causing a sudden inspiratory movement with rapid closure of the glottis through the stimulation of the laryngeal filaments of the vagi.

Seven distinct types are demonstrable.

1. *Simple*.—A type caused by sudden exposure to cold and the drinking of a cold potion or cold carbonated beverages. In this type the symptom lasts not more than three to five minutes.

2. *Inflammatory*.—A type which appears after the onset of such inflammatory diseases of the abdominal organs as gastritis, appendicitis, enterocolitis, pancreatitis, strangulated hernias and in any condition causing a high temperature which produces a general congestion of the viscera. During the influenza epidemic the persistent and obstinate hiccoughs noted were found in the majority of cases to follow a marked congestion of the upper respiratory tract as well as an inflammation of the bronchi, and as soon as this inflammation had subsided the singultus disappeared. In acute inflammatory diseases of the abdomen, hiccough is a bad omen.

3. *Irritative*.—This class is usually of a transitory nature when it is brought on by a single acute indigestion or dilatation of the stomach. It is frequently seen after the ingestion of foods of high or low temperature or very spicy foods. The condition is most common in the gastrointestinal irritations. It is an alarming symptom in postoperative conditions and especially when there has been manipulations of the upper abdominal region causing a reflex irritation of the phrenics and pneumogastrics through an existing inflammation of the viscera supplied by these nerves.

4. *Traumatic*.—Hiccough was a frequent symptom seen in the practice of war surgery, especially of gunshot wounds of the neck, chest, and upper abdomen where the pneumogastrics or phrenics were injured or the tissues supplied by them inflamed.

5. *Specific*.—In uremia when urates and urea begin to diminish rapidly in the urine and uric acid and cholesterol rapidly begin to increase in the blood, there is often the onset of an obstinate hiccough which fluctuates with the increase or decrease of the chemical blood constituents.

6. *Neurotic*.—A hysterical singultus in a neurotic person is not uncommon.

7. *Unknown origin*.—The hiccough in bronchial asthma and that coming on with a terminal arteriosclerosis can not be explained by any known factor.

The hic or spasmodic closure of the glottis usually comes on every 10 to 16 seconds. If the spasms become more numerous the prognosis is grave, due to the rapid onset of exhaustion. When the attack has lasted several hours, in addition to the signs and symptoms of the causative factor, soreness and pain over the epigastrium and lower chest becomes manifest. This is followed by a sense of pain in the throat with dryness and extreme thirst. Headache comes on and may be severe. There is a rapid, weak pulse, and vomiting. The patient becomes nervous and worried and has fear of impending death, and gradually he becomes exhausted and either falls asleep and wakes repeatedly or he passes into a coma with high temperature, and dies.

The simple type requires no treatment in the majority of cases, but should the condition become annoying, the author recommends the following physiomechanical methods: (1) Tongue traction for two minutes, (2) holding the breath and counting, (3) the blowing of a wind instrument, (4) galvanism applied to the neck, (5) lowering of the head and stretching of the sphincter ani, (6) sipping of water, hot or cold, (7) pressure in the neck over the fifth cervical vertebra, (8) tickle the throat (vomit) and tickle the nose (sneeze), (9) gargle with a bitter solution, (10) have the patient inhale amyl nitrite, (11) mustard plaster applied to the epigastrium, (12) ice bag or ethyl chloride spray to the epigastrium, (13) the flexion of the legs on the thighs and the thighs on the abdomen, (14) pass a stomach tube or an esophageal bougie.

Should these simple methods fail a few whiffs of chloroform will usually stop any persistent hiccough.

In hiccough caused by the inflammatory process the disease should be treated above all, and then the hiccough should be attacked by the elimination of toxins through gastric lavage with bicarbonate of soda, soap suds enemas, purges, emetics. In the severe inflammatory diseases opiates should be administered early.

Many cases during the influenza epidemic were relieved by spraying the nose and throat with a solution of cocaine and adrenalin, together with hot applications to the epigastrium and small doses of atropine. In the treatment of irritative singultus, one should always remove the cause if possible. This is generally an acute dilatation of the stomach or an acute gastritis, which are relieved by purges, emetics, and enemas. The pain is allayed by means of hot-water bottles to

the epigastrium. When vomiting, if present, has ceased, a little cocaine may relieve the nausea. If the singultus persists after the treatment for the primary condition has been carried out, the physio-mechanical methods mentioned above may be tried, and if they are not successful atropine alone or with morphine should be used. If used alone it must be pushed until the physiological effect is seen.

In postoperative conditions where there is an obstinate singultus it is good practice to keep the patient under opiates. (W. M. K.)

LOWSLEY, O. S. The rôle of the prostate and seminal vesicles in arthritis. New York Med. Jour., May 4, 1921.

In recent years interest in the subject of arthritis has been revived by the excellent work done on focal infections of the teeth, tonsils, and sinuses, and in this article Lowsley calls attention to the prostate gland and seminal vesicles as sites of focal infection. The report is based on a study of more than 100 cases of gonococcus infections of the joints.

His conclusions are:

1. No case of arthritis in the male adult is properly investigated unless a rectal examination is made.

2. Prostatic fluid should be examined in the fresh state under the high-power lens of the microscope to determine the presence of pus or pathological elements. The process of staining masks the true conditions in some instances.

3. In a chronic prostatitis the gonococcus is rarely met with.

4. Treatment suggested in very acute arthritis (gonorrheal):

- (A) Rest in bed.

- (B) Massive doses of gonococcus vaccine seem to allay the pain in many instances.

- (C) In some cases vaccine relieves the pain temporarily. In fact, almost any procedure, including the administration of an anesthetic without operation, will relieve the discomfort temporarily.

- (D) Dr. Collings's work on very heavy plaster casts proves his method to be as beneficial as any other treatment tried, if not more so.

- (E) Dr. Keyes's suggestion that the proper time to operate upon seminal vesicles is in the earliest stage of acute gonorrheal arthritis may turn out to be a very valuable plan to pursue.

- (F) It would seem logical that the only kind of seminal vesicles that should invariably be operated upon are the ones distended with pus, that can not be emptied by stripping, and that seminal vesiculectomy is the preferable operative procedure. This applies to cases of acute and chronic arthritis.

- (G) After the very acute joint symptoms have subsided the prostate and seminal vesicles should be treated until they are cured. If

they are left in a state of chronic inflammation, the patient is harboring a slumbering volcano which may burst into activity upon the slightest provocation.

(H) Autogenous vaccines, obtained from prostatic and seminal vesicle fluid, have proved to be extremely valuable adjuncts in some instances. They should be used in conjunction with routine prostatic treatment, however, otherwise the prostate will remain a scarred, leathery mass, bound down by adhesions, and a constant source of irritation.

5. One should not approach the subject of arthritis with a fixed plan of procedure. The type of treatment should be determined by the character of the case. (W. M. K.)

NEUBERGER, J. F. *Medical aspects of Naval aviation.* Mil. Surgeon, July, 1921.

In speaking of the physical examination of candidates for aviation duty, the author points out the difference between the physical requirements of a lighter-than-air pilot and a heavier-than-air pilot. Heavier-than-air machines include airplanes and seaplanes of all sorts, and lighter-than-air machines comprise dirigibles and free and kite balloons. A man with an average physique might make an excellent lighter-than-air pilot, but he can not handle an *H-16* or any other heavy seaplane where physical strength and endurance are required over a long period of time. The minimum weight of any heavier-than-air pilot in the Navy should be 150 pounds. It takes considerable strength and endurance to handle a big boat in bumpy air. The best physical specimens are often in danger on account of bumpy air. Men weighing less than 150 pounds should not be trained in heavier-than-air crafts, unless they are constantly retained for small seaplanes or scout duty, which is not the policy of the Navy at the present time.

In order to obtain a certain standard in regard to height, weight, and muscular development, the author recommends the following methods. The first method is known as the "factor of Bouchard." The factor is represented by P/H . P is the weight in kilograms and H is the height in decimeters. The average of this factor gives a first indication of wasting or obesity. This factor, however, only gives a preliminary indication. It may range from one to seven. No one under 3.9 or above 5 should be accepted. If, for instance, a man weighs 140 pounds and measures 69 inches, then the factor would be as follows:

$$\begin{aligned} 140 \text{ pounds} &= 63 \text{ kilograms.} \\ 68 \text{ inches} &= 17.2 \text{ decimeters.} \\ \text{Therefore } \frac{63}{17.2} &= 3.7. \end{aligned}$$

The man is therefore under passing mark.

Another index of measurement, which the author considers better than the "factor of Bouchard," may be taken from the formula $(P+p)-T$, P representing the weight in kilograms, p the circumference of the chest in centimeters, T the height expressed in centimeters. The average constant for a qualified subject is -20 . The farther the figure falls below this mark the better will be the general constitution of the man under examination. Neuberger checked all the pilots at the United States Naval Air Station, Rockaway Beach, by this method and found that those pilots who came farthest below the average mark were not only the best physical specimens but also were the best aviators on the station. Neuberger picked out for illustration three fliers, who were all heavy seaplane pilots. The first man has the reputation of being an excellent pilot, the second is a fairly good pilot, and the third one has been reported by the squadron commander as having a great deal of difficulty in handling a large plane.

Officer No. 1 (excellent pilot):

Weight.....	187	pounds=	83	kilograms.
Height.....	70½	inches =	187	centimeters.
Chest (means).....	38	inches =	98	centimeters.
$(83+98)-187=-6$.				

Officer No. 2:

Weight.....	147	pounds=	66.5	kilograms.
Height.....	66	inches =	167	centimeters.
Chest (means).....	34	inches =	86	centimeters.
$(66.5+86)-167=-14.5$.				

Officer No. 3:

Weight.....	121	pounds=	55	kilograms.
Height.....	68	inches =	172	centimeters.
Chest (means).....	30½	inches =	77	centimeters.
$(55+77)-172=-40$.				

(W. M. K.)

MICHEL, L. L. AND GOODMAN, H. Treating syphilitics. New York Med. Jour. July 20, 1921.

The authors came to the following conclusions:

1. The patient with syphilis, and not syphilis, should be considered by the physician when it comes to treatment. The tissues of the patient are worthy of respect, especially when one considers that the assault of the drugs needed in treatment is added to the tissue damage of the spirochetes.

2. Specific treatment of the syphilitic requires arsphenamine, or one of its newer salts, neoarsphenamine, sodium arsphenamine, or silver arsphenamine. Mercury is also used in the specific treatment. The iodides are very valuable, especially in the later stages of the disease.

3. The use of arsphenamine in the prophylaxis of syphilis is a phase in treatment that is very important, and its results make it worthy of wider use. Its share in the public-health aspects of this disease are especially valuable.

4. The intensive treatment in the early syphilitic, both when the abortive action and the quick and thorough sterilization of the patient seems feasible, is recommended for otherwise healthy persons with syphilis. Care in selection of the patient for this form of therapy is of first importance.

5. Modified forms of injection of arsphenamine should be given according to the patient, the reactions of his excretory organs, response to drugs, and phase of the disease process.

6. Iodides form a valuable addition, and the intravenous route should be considered, especially if large doses by mouth tend to upset the patient.

7. Systematic and systemic examination of the patient should be made at intervals, with especial reference to the cerebrospinal system. When indicated, the lumbar puncture for diagnosis and treatment is advised.

8. Routine treatments in syphilis should be disregarded. Every syphilitic patient should be treated as an individual requiring attention, and not as a case of syphilis. (W. M. K.)

VEDDER, E. B. The etiology of scurvy. Mil. Surgeon, August, 1921.

The author in discussing his investigations into the etiology of scurvy gives the following well-defined method of procedure for investigating the nature of the dietary deficiency producing a certain disease of this nature:

1. Find a suitable experimental animal; i. e., one peculiarly susceptible to the specific deficiency and which, therefore, suffers from the disease after a short depletion period.

2. Use a diet complete with respect to other food elements, but which produces the particular disease with regularity in the chosen animal. Such a diet should contain not only protein, fat, carbohydrates, and salts, but a sufficiency of accessory food substances other than the one under investigation.

3. Find a food that prevents the disease when added to the above diet.

4. Find the minimum amount of this food necessary to confer protection.

5. Prepare extracts of this food that also confer protection. The non-essential elements of the protective food are then eliminated one by one, and when a sufficiently simple extract has been secured, the nature of the accessory food substance may be determined by chemical methods.

Holst and Froelich, in 1907, not only showed that the guinea pig was susceptible to scurvy but that the disease was the same pathologic process observed in man, and like the disease in man, could be cured or prevented by the administration of fresh leaves, such as

cabbage and by certain fruit juices. More recent investigations have taught us much concerning the prevention and treatment of scurvy, including determinations of the relative amount of antiscorbutic substance in certain foods, and the effect on this substance of drying and cooking such foods; but we have learned little concerning the chemical nature of the antiscorbutic substance since that time.

Vedder began some investigations in 1917, the purpose of which was to learn as much as possible about the chemical constitution of the antiscorbutic substance. His conclusions are as follows:

1. Scurvy can be produced in guinea pigs with regularity by feeding a liberal and varied diet consisting of oats, mixed scratch feed, bread, sterilized milk, and hay.
2. Scurvy may be prevented by the daily addition of 5 grams of green grass or 5 c. c. of filtered orange, lemon, or grapefruit juice, and cured by larger amounts.
3. The antiscorbutic vitaliment is soluble in water, absolute alcohol, acetone, and commercial ethyl acetate.
4. The antiscorbutic vitaliment can not be extracted from the partially dried juice by ether, chloroform, or carbon tetrachloride.
5. The antiscorbutic vitaliment differs from the beriberi-preventing vitaliment in the following particulars:
 - A. The antineuritic vitaliment is absorbed by finely powdered animal charcoal. The antiscorbutic vitaliment is not so absorbed.
 - B. The antineuritic vitaliment is precipitated by phosphotungstic acid. The antiscorbutic vitaliment is not so precipitated, but is probably destroyed.
 - C. The antineuritic vitaliment is a nitrogenous base. The antiscorbutic vitaliment is apparently nonnitrogenous.
6. By means of the solvents mentioned above a purified extract has been prepared which is suitable for further chemical study.

(W. M. K.)

HOWE, P. R. Food accessory factors in relation to the teeth. *Jour. Dent. Research*, March, 1921.

The condensed review of Dr. Percy R. Howe's work in connection with food accessory factors in relation to the teeth appears in the March number of the *Journal of Dental Research*, and the subject matter, together with some 50 illustrations, gives food for reflection, as his conclusions may lead to a modification of the generally accepted theory of Miller's bacteriochemical causation of dental caries.

Howe regards Miller's theory as an inadequate explanation of the etiology of caries, but believes, however, that the supply of vitamins in the diet may have much to do with the incidence of caries and with the extensive decalcification, "in the teeth, in the alveolar process, and in the jaws themselves."

The experiments described were conducted on guinea pigs and rabbits, with diets that were "deficient in each of the three known kinds of vitamins" and strikingly scorbutic in general effect.

Howe believes that the fat-free milk in the diets "presumably furnished a sufficient amount of inorganic constituents."

Scorbutic effects could be, and were, prevented or repaired by addition to the diet, when desired, of suitable amounts of antiscorbutic foods, such as orange juice.

Howe summarizes the significance of his findings in the conclusion that it is his ability "to produce decalcified areas in the bones of the head and in the teeth, with deficient diet, and to effect their recalcification with adequate diet, that is the most striking thing in these experiments."

A determination of causative factors often leads to the discovery of scientific preventive measures, and it is to be hoped that further developments along the lines indicated above may ultimately prove of practical value in the dental field which offers the widest of opportunities, that of preventive dentistry. (H. E. H.)

SURGERY.

STEPHENS, H. E. R. Immediate surgery in fighting ships.¹ Jour. Roy. Nav. Med. Service, London, April, 1921.

Surgeon Lieutenant Commander Stephens reviews the surgical treatment of the injured immediately after a sea engagement. The explosion of a shell either on the upper deck or between decks creates utter disorder. The most severely wounded should receive attention first but in practice there is little time to pick and choose. Morphia should be administered in full doses by the hyperdermic method, and a label indicating the dosage and the time fixed to the clothing. There is no other article in the surgeon's equipment so indispensable as this drug. Half a grain as the initial dose gives satisfactory results. Men who have sustained severe injuries a few minutes previously bear full doses admirably, and therefore the drug should be administered boldly.

Whether the time and labor expended in teaching the principles of first aid to the ship's company is justified by the results obtained in practice is a matter open to discussion. The moral effect is no doubt excellent, but, on the other hand, the average British sailor does not take kindly to bandaging wounds. When a catastrophe occurs the majority are terrified at the sight of their mutilated shipmates; instinctively they shrink from touching blood and invariably seek aid from the trained staff. Stephens's war experience has proved to him that every officer should be well grounded in the principles of first aid.

¹ See Keen's Surgery, Vol. VII, p. 249.

Owing to the high temperature of shell fragments, the occurrence of primary hemorrhage was less than was expected. In the large shell wounds the tissues are seared and torn and consequently ooze rather than bleed profusely. When primary hemorrhage does occur it is apt to be profuse.

When the ship is outside the range of further action and "secure" has been sounded, the activities of the surgeon will enter upon a second stage in the practice of emergency surgery. The amount of immediate surgery to be undertaken will depend on the time which will elapse before the wounded can be transferred to a hospital ship, a base, or a neutral port, and the state of the ship herself and the probability of a second engagement.

Emergency surgery does not call for an abundance of instruments and the British medical officers found that those supplied to fighting ships amply fulfil all reasonable requirements.

Stephens says that the metal tourniquet devised by Sir George Lenthal Cheatele marks a distinct improvement over the india-rubber one of Foulis for use in a ship. Its chief advantages lie in the ease of application and the accuracy with which it can be adjusted to control hemorrhage absolutely or flush the tissues when desired. The instrument consists of a chain and securing hook controlled by an operating screw with a handwheel. The bridge is applied over the point of compression. A towel should separate the apparatus from the skin; and the whole can be sterilized by boiling.

When under the anesthetic each patient should be examined systematically in order that injuries to the eyes, ribs, back, or buttock may not be overlooked. Unsuspected lesions discovered are noted at the time, so that on transfer to the hospital ship a concise and complete description of the injuries may accompany each man.

Contusions are more commonly produced by men being thrown against a bulkhead or one of the internal fittings of the ship by the force of an explosion. Others are caused by the falling of part of the superstructure. They present an infinite variety and occur in unexpected positions.

If we except burns, contused lacerated wounds are responsible for most of the casualties. They differ from those encountered in military surgery by the absence of contamination with earth—a fundamental difference.

The importance of cleansing the skin in the vicinity of any wound can not be emphasized too often. Ether soap is useful for the purpose and a spirit lotion of mercury biniodide or iodine is then applied. The superficial wounds should be opened up freely so that the interior may be cleansed and a thorough search made for foreign bodies, especially tags of clothing. If the surgical toilet has been efficiently

carried out, complete excision of the wound with primary suture is the method of choice.

In deep lacerated wounds the damage below the surface invariably exceeds that which is visible to the eye. A free incision for disinfection of the cavity is indicated, but as little repair as possible is attempted, and anything in the nature of a dissection rigidly avoided. Extensive exploration of the deep-lying structures can not be justified unless hemostasis is the object. Tissues that are manifestly devitalized should be excised. Rough handling of the parts can not be condemned too strongly; it increases secondary wound shock. Strips of fasciæ and torn tendons which hang loose are best removed, since they usually slough owing to their poor vascularity. Fragments of bone lying free may be taken out without any misgiving.

Primary suture of deep, ragged, and lacerated wounds is contraindicated absolutely; but the aim of the surgeon is to render them eligible for delayed primary suture of a later period. Complete hemostasis is first secured. Large arteries are ligated at the site of injury or at a distance according to circumstances. Nerves suture is out of the question, but section and injury of nerves should be carefully noted for the information of those who receive the case in a hospital ship or shore establishment. These large wounds may be safely left open after cleansing if free drainage has been established. Perforated rubber drainage tubes should be inserted to the bottom of the cavity and packed lightly around with sterile gauze. These tubes enable the deepest parts of the wound to be flushed with a suitable antiseptic solution during transportation. However, extensive and lacerated a wound may be, acute suppuration or gross infection can be overcome by intelligent application of these principles and the majority of wounds will reach the base ready for delayed primary suture.

A large number of the diverse varieties of splints are out of place in a fighting ship. The large number of compound fractures sustained in action, however, seems to call for a universal splinting material. The aluminum alloy introduced by Sir Frederick Treves supplies the want. This substance is almost ideal for emergency work afloat. It is easy to mold into the required shape; it is light, serviceable, takes up little space, and in use is efficient.

Fractures of the humerus are best put up in the type of splint devised by Hey Groves or Sir Robert Jones. Fractures of the femur are difficult to handle on a fighting ship. Most of them are compound and require a general anesthetic for cleansing the wound. When the cleansing process is completed the limb should be extended and immobilized in a Thomas's knee splint.

Owing to the peculiar nature and the high mortality associated with severe burns, they have assumed a position of great importance

in naval surgery; and their treatment demands the utmost care and attention from the surgeon. The cardinal point in treatment is the prevention of infection. With this in view all burns should receive a most thorough cleansing, preferably under a general anesthetic as soon as possible after infliction.

As a primary dressing, picric acid is recommended; as a permanent dressing, the prevailing opinion is opposed to its use. Stephens recommends an oily dressing consisting of menthol 3 grains and oil of eucalyptus 3 minims to an ounce of carron oil. A 1 per cent aqueous solution of aluminum acetate is useful for superficial burns, but is apt to be irritative. The paraffin preparations, like ambrine, are still in an experimental stage, yet they bid fair to supersede all other preparations.

Secondary wound shock is caused by the toxins absorbed from damaged tissues, hemorrhage, cold, and fatigue. It is prevented to some extent by reducing the transportation of the wounded to the minimum, shielding them from exposure, and controlling hemorrhage. When the symptoms appear, immediate remedial measures become imperative. Intravenous administration of a 6 per cent solution of gum acacia in normal saline gave the best results on board ship. This procedure not only increases the blood volume but also the viscosity of the blood itself. It relieves the oligæmic state and prevents it from reasserting itself.

It is manifestly impossible to lay down hard and fast rules for amputation. Extreme cases present no difficulty. Removal of a badly shattered limb adds to the comfort of the patient and improves his chance of recovery. In cases where the injury is not severe, a thorough examination of the lacerated parts will decide the question of amputating or not. The main principles of conservative surgery should remain uppermost in the surgeon's mind, and his efforts should be devoted to saving the limb rather than removing it. Extensive laceration of muscle associated with marked comminution of bone do not justify amputation. Many cases, which at first appeared hopeless, recover in a remarkable manner provided that acute suppuration can be avoided. On the other hand, where the main blood vessels and nerves have been destroyed, or the distal parts pulped, the prospects of a sound recovery are enhanced by a simple and rapid amputation. (W. M. K.)

DALTON, F. J. A. Immediate surgery of war wounds as practiced in hospital ships. Jour. Roy. Naval Med. Service, London, July, 1921.

Surgeon Captain Dalton, R. N., tells of his observations on the hospital ship *Rewa*, of which he was in charge. He found that the character and amount of immediate surgery on wounded admitted to the hospital ship varied a good deal with the circumstances under

which the wounded were received and the time they were to remain on board. In the *Rewa* the length of time patients remained on board varied from 36 to 48 hours while conveying French wounded from Dunkirk to Cherbourg during the first Battle of Ypres, in 1914, to between three and four weeks when conveying wounded from the Gallipoli beaches to England.

The French wounded arrived on board completely exhausted, hungry, and caked from head to foot with thick clay. Many of them had been lying in the wet fields for 48 hours after they had been wounded and before being found by the ambulance parties. The majority had their first field dressings on their wounds.

A large proportion of the fractures were not even splinted. Among these men one often saw the evil effects of a misapplied or too long applied tourniquet, necessitating amputation of arm or leg for gangrene.

At the Gallipoli beaches the ship was working under very different conditions to those appertaining to France. The weather was very hot and the atmosphere dry as opposed to cold and almost constant rain in France. The wounded were received soon after being injured, and the "first aid" had been efficiently done, fractures being splinted and dressings carefully applied, and injections of morphia given.

There were two serious disadvantages in working with the wounded at Gallipoli. One was the plague of flies and the other was the fact that so many of these patients were already suffering from severe diarrhea when wounded.

Patients were hoisted on board, simply black with myriads of flies, and soon the whole ship was infested with them. On removing the dressings, wounds were often found to be infested with maggots.

The diarrhea was of a severe type, and large numbers of wounded were badly soiled by feces. The additional work entailed in cleaning these patients was considerable, as compound comminuted fractures of the thigh were very common.

The following routine was adopted on the *Rewa* when receiving patients: Every patient was seen by a medical officer as he was hoisted into the ship or walked on board. If considered a suitable case for examination in an operating room, he was placed in a cot resting on the deck outside one of the operating theaters to await his turn; if not, he was put to bed in a ward; or if a walking case, sent to a dressing station, to be seen by the medical staff of the dressing station. It was a standing rule that if the examining medical officer had any doubt in his mind as to which category a case belonged, he was always to decide it was an operating-room case. Thus all compound fractures, head injuries, injuries about the neck, cases requiring amputation, all wounds where fresh hemorrhage was taking place,

large bomb and shell wounds, and abdominal wounds automatically passed through one of the operating theaters before being put to bed. This method of dealing with the wounded entailed enormously heavy work for the whole staff; the longest stretches of continuous work in the theaters extended to 44 and 46 hours on two occasions, but stretches of 12, 15, and 16 hours were not infrequent. During these long hours of work sandwiches and coffee were supplied at regular intervals to the staff and partaken of in the anesthetic rooms while the theaters were being washed down with a hose. The operating rooms used to get into an indescribable condition of filth and needed washing down frequently. There was no doubt that this immediate dealing with all the more serious cases was the means of saving many lives and more limbs.

The average patient received exhibited very little shock. This fact must be credited to the large dose of morphia administered between the time of being wounded and the arrival on board. Patients who did arrive with severe shock were generally those with wounds of the abdomen or chest, lacerated bomb and shell wounds with destruction of tissue over large areas, cases that had lost much blood from wounds of main vessels, and cases of compound fractures of large bones.

All cases of severe shock were placed in bed for 6, 12, to 24 hours, and the usual remedies for shock, such as warmth, hot drinks, stimulants, and intravenous saline applied.

No attempt at skin sterilization was made until the patient was brought into the operating room under an anesthetic, when, his clothes having been removed, a wide area around the wound was shaved and well scrubbed with soap and water with the aid of a nail brush. This area was then dried off with methylated spirit and 1 in 40 carbolic lotion applied.

Chloroform, chloroform and ether in the proportion of one to two, and open ether were the anesthetics used in the order of their popularity.

An essential for success in operative work of this kind on a hospital ship is the working out of the administrative details of each operating table to the minutest degree. Each table must have its own equipment and operating team.

After the skin area had been cleaned, the wound was investigated, foreign bodies and loose fragments of bone removed, muscle and fascia which had been injured and was likely to slough was cut away. Free counteropenings were made for efficient drainage, and large drainage tubes with copious irrigation with sterile salt solution or Dakin's hypochlorite solution were used.

Among over 20,000 cases treated on the *Rewa* not a single case of secondary hemorrhage occurred.

Captain Dalton remarks that the aluminium splint was, on the whole, rather disappointing as it was not really strong enough for large heavy limbs. Among the named splints he found most useful were Thomas's hip and knee splints, Hodgen's splint, Middeldorp's triangle. The best splint, in his opinion, for the transport of fractured thighs was Thomas's splint.

The operating staff of the *Rewa* found that there are two regions of the body which do not invite immediate surgery for gunshot wounds, viz, thorax and abdomen. In injuries of both there is usually profound shock when the patient is received on board, and this alone eliminates the question of immediate operation.

Wounds of the thorax, when the missile has passed through the chest without injury to large vessels or spinal column, do remarkably well without surgical interference, the patient being kept under morphia and the shock counteracted. Usually the patient has slight hæmoptysis and considerable dyspnea, but both pass off rapidly. A few develop empyema or consolidation of a lung. In gunshot wounds of the abdomen, each case must be dealt with according to its own particular symptoms. The majority of these cases are too shocked to stand immediate operation, and are placed in the Fowler position, kept deeply under morphia, given nothing by the mouth, and only saline by the rectum or intravenously. A fair proportion recover under this expectant treatment, some requiring suprapubic drainage for their peritonitis.

"The most rapidly fatal cases, apart from those dying very quickly from internal hemorrhage, are those in which the projectile has passed through the abdomen from side to side, the most favorable being those in which the projectile has passed anteroposteriorly through a lateral region of the abdomen. Wounds through the bladder or rectum only, or through both, without injury to any other hollow viscus, could usually be operated on at once, and did remarkably well." (W. M. K.)

MOZINGO, A. E. The surgical treatment of empyema by a closed method. Am. Jour. Med. Sc., May, 1921.

This article is based on a series of 138 cases, 45 acute and 93 chronic, treated by the writer, with a mortality of less than 2 per cent, when he was in charge of the empyema wards at Walter Reed General Hospital, and Base Hospital, Camp Pike, Ark. The writer devised what may be termed a closed method of operating for empyema in which he inserts a single rubber tube into the pleural cavity, air-tight and maintaining negative pressure, through which the pleuritic fluid is removed and an antiseptic fluid injected.

The technique of his method as applied in acute cases is as follows: The place of election for operation is the eighth interspace in the postaxillary line. A diagnostic puncture at this point having revealed fluid containing microorganisms, the operation is performed at once regardless of the condition of the patient or stage of pneumonia. Care must be taken to prevent wounding the lung. Two cubic centimeters of 0.5 per cent procain is sufficient for local anesthesia. The cannula surrounding the trocar should be just large enough to admit snugly a standard Carrel tube.

"At the site of operation, a stab not more than 5 mm. in length, through the skin only, is made with a curved bistoury. The cannula is smeared with vaseline to prevent the edges of the tiny wound from clamping it. The patient should have the arm and shoulder raised, take a deep breath and hold it, thus separating the ribs as the trocar is inserted. The needle puncture, skin stab, and insertion of the trocar can all be done in less than a minute.

"The tube should be about 15 inches long, seamless, and have from 5 to 10 fenestræ, about 3 mm. in diameter and 1 cm. apart, within the pleural cavity to facilitate the removal of fluid when fibrin clots are present. When the trocar is removed, instantly the rubber tube is inserted through the cannula, which is now removed, leaving about 6 inches of the tube outside the chest.

"The tube is held air-tight by the contracting wall of the wound and may be connected with a Potain aspirator or the fluid may be removed by a half-ounce bulb syringe, which is used in giving the treatments. Should the respiration become embarrassed from too rapid removal of the fluid, it is advisable to stop a moment or inject 200 to 400 c. c. of Dakin's solution before continuing the removal. If the patient has a high temperature, with active pneumonia, normal saline is used to cleanse the cavity instead of Dakin's solution. This is done by refilling the cavity nearly one-third and agitating the fluid in the cavity by quick compressions and expansions of the bulb.

"The small dressing permits free chest expansion. A No. 00 safety pin is thrust through the edge of the tube. Two thin pads of gauze, each 1 inch square, split to the center, are placed over and under the pin. A pad 2 inches square of 12 layers of bandage gauze, with a hole in the center, made by a pointed and rounded instrument, and never cut, so as to admit the tube snugly, is then applied. Four strips of adhesive, each $1\frac{1}{2}$ inches wide and $3\frac{3}{8}$ inches long, are applied so as to make the finished dressing square. This dressing will frequently last several days, as there is seldom any soiling around the tube unless the incision was made too large or the patient have a very persistent cough, which should be controlled if possible. Should the dressing become soiled a razor blade is best to cut the dressing

from the tube. Usually it will suffice to loosen one side of the dressing, change the two small pads, and apply a new strip of adhesive. The patient can lie in any position without discomfort or danger of the clamps or tube becoming loose.

"Each patient should have his individual tissue forceps, syringe, and Dakin's solution in a wide-mouth bottle where the syringe is kept between treatments. The forceps facilitates handling the tube in preventing air from entering during treatment and makes the wearing of gloves unnecessary. The end of the tube is kept sterile by being capped with the rubber from a medicine dropper held on by a Daeffenbaugh clamp, a spring clamp, or a bulldog clamp, which maintains the negative pressure.

"In giving the treatment it is best that no air enter. The tube is first compressed with the tissue forceps, the clamp and cap removed, the nozzle of the syringe inserted with the bulb compressed and the secretions aspirated. From 50 to 200 c. c., depending on the size of the cavity, of Dakin's solution are now injected and agitated. This is removed and the process repeated until the return is clear. An amount equal to about one-fifth the original capacity is now injected and left in from 5 to 30 minutes, then removed, and the maximum negative pressure reestablished. The treatments usually are given every three to five hours by day and once or twice at night until the pyogenic membrane and fibrous exudate have been dissolved, a process taking from 2 to 14 days, depending on the kind of infection, duration of case, size of cavity, and the general condition of the patient. Subacute cases will tolerate more vigorous treatment, while cases with active pneumonia should be irrigated only every four to eight hours until the symptoms subside.

"Glass piston syringes should not be used; unlike the bulb syringe, they are expensive, break easily, troublesome to sterilize, and difficult to handle.

"The suction power of the bulb syringe will lift water to a height of 8 feet in a 6 mm. tube. That it will prevent pneumothorax is clearly shown by a radiogram taken just before and after negative pressure is established. Very little suction is required to expand the lung, and frequently the patient can not endure the pain caused by the maximum negative pressure of the bulb.

"When the tube is purposely opened, air immediately enters as the lung collapses to a certain degree, which depends largely on the adhesions and size of the cavity. If air so admitted is aspirated, the number of bulbs of air removed counted, and the whole process repeated, the number of bulbs of air removed will invariably be the same; furthermore, if after a maximum negative pressure is attained and any known number, say 5, 15, 30, bulbs of air are injected into the cavity and the process reversed, the number of bulbs of air aspi-

rated will always correspond with the number injected. The same is true if a liquid is used instead of air, thus proving conclusively that the empyemic cavity can be entirely emptied of either air or fluid. The same is true regardless of the position of the patient or whether the tube is inserted at the most dependent part of the cavity.

"That negative pressure is maintained for several hours is shown by the sound of air rushing into the cavity when the tube is left open and by the patient feeling a change of pressure; or if the tube is connected to another tube leading into a bottle containing Dakin's solution, the solution will be drawn into and fill the cavity.

"When a large empyemic cavity is thoroughly cleansed and 150 c. c. of Dakin's solution injected and kept agitated, a specimen withdrawn at the end of 1 minute will usually test about 0.38 per cent, and after 5 minutes will usually test about 0.07 per cent.

"In cleansing the empyemic cavity it is not essential that the sodium hypochlorite solution be 0.47 per cent, as 0.6 per cent can be used for a reasonable time with safety in the pleural cavity. With such a wide margin it is a simple matter for those who do not have the usual facilities for making and testing Dakin's solution to make up a solution sufficiently accurate from the various commercial products. Hypochlorite is used now and found to be both convenient and effective.

"After the amount of secretion and sediment have been greatly reduced, usually in 4 to 10 days, and smears and cultures are negative or nearly so, instead of continuing the treatment as before one should change to and inject a 24-hour-old solution of 2 per cent dilution of liquor formaldehyde in glycerine once daily for the following reasons:

"1. Complete sterilization is attained in from three to seven days, and the tube can be removed before the cavity is completely obliterated.

"2. There is less discomfort to the patient and his sleep not disturbed.

"3. The cavity is made to develop a tolerance for an antiseptic, which antiseptic is advisable to leave in the cavity when the tube is removed to prevent recurrence.

"4. The resultant secretion following the injection of the formaldehyde solution forms unfavorable media for bacterial growth, and when sterile will be readily absorbed and the cavity obliterated.

"The first two or three injections, which should not be over 5 c. c., will usually cause a rise of temperature, and for this reason should not be used too early in acute cases. The amount may be increased up to 15 c. c., but larger amounts are not necessary. Before each injection the cavity is given the usual treatment with Dakin's solution. If there is much sediment present the regular two-hour treatments with Dakin's solution should be given during the day and the formaldehyde solution treatment given once for the night.

"It has been observed that both smears and cultures sometimes will remain positive for organisms for several days after beginning this treatment, even when the secretion gives a positive test for formaldehyde. There will be, however, a gradual decrease in the number of bacteria in both smears and cultures, and sometimes the latter becoming negative first.

"Removal of the tube.—The original tube is not removed until the case is completed. Just before the tube is removed the cavity is given a thorough treatment with Dakin's solution and from 5 to 10 c. c. of formaldehyde solution are injected and left in the cavity. The dressing should first be removed and the skin cleansed with ether. An iodine swab is inserted in the sinus and rolled around the tube. The finger 1 inch from the sinus will compress the sides of the sinus during and after the tube is quickly removed to prevent air from entering. The sinus is again treated with an iodine swab, the field cleansed with alcohol, and the sinus closed with three wide strips of adhesive 6 inches long. Sometimes it is well first to make two folds of skin over the sinus or apply a tiny alcohol pad. The second or third day it is well sometimes to remove the adhesive, treat the sinus, and apply a similar dressing."

Regarding this method of treating empyema, the author has come to the following conclusions:

1. Early operation by the closed treatment method has the following advantages:

(a) It can be done, regardless of the stage of pneumonia or serious condition of the patient, without the least shock or collapse of the lung.

(b) It provides complete evacuation of the empyema cavity, relieves cardiac and respiratory embarrassment, and prevents the absorption of toxins and the usual resultant complications.

(c) It lessens the usual thickening of the pleuræ and prevents the lung, compressed by the exudate, from becoming fixed in compression.

2. The closed method has the following general advantages:

(a) Productive of great economy of time, labor, and dressing material.

(b) Causes the minimum pain and discomfort to the patient.

(c) The dressing is small, lasts several days, without skin irritation, and does not constrict the chest.

(d) Uncomplicated cases of empyema are not kept in bed.

(e) Cases are less likely to have recurrence, become chronic, or need a secondary operation.

(f) The constant negative pressure gives maximum expansion of the lung.

(g) The scar is very small, and there is no chest deformity.

(h) Practical in the home and in country practice.

(i) The postoperative treatment in greater part may be done by a nurse or a properly instructed member of the family.

(k) Bacteriologic and roentgenographic laboratories, while always to be preferred, are not absolutely essential.

(l) The mortality is lower than by any other method.

(m) Can effect cure in acute bilateral empyema, both sides being operated at the same time, with acute bilateral pneumonia present, which treatment is impossible by the open method.

3. Dakin's solution, because of its great solvent and bactericidal action, is the most nearly ideal solution to use in the preliminary treatment of the empyemic cavity to dissolve the fibrinous exudate and partially sterilize the cavity.

4. Liquor formaldehyde in glycerine, 2 per cent dilution, is the best solution to use in the empyemic cavity after the preliminary treatment with Dakin's solution to complete sterilization, shorten the course of treatment, and prevent a recurrence.

5. Smears and cultures after the formaldehyde solution treatment is begun will each show a rapid decrease in the number of bacteria, which are sometimes found two or three days in the smear after the culture will be sterile.

6. Bronchial fistulæ are more common than is generally suspected. With this complication salt solution should be used in amounts as large as possible and not cause the patient to cough.

7. A hypochlorite solution of increased strength over Dakin's solution in both alkalinity and available chlorin can be used in the empyema cavity with safety.

8. The available chlorine in Dakin's solution after injection into the empyemic cavity rapidly decreases. The strength after one minute averaged 0.38 per cent and after five minutes 0.07 per cent.

9. Dakin's solution can be made with sufficient accuracy from various commercial products by those who do not have the usual facilities for making and testing this solution.

10. The progress of acute cases when less frequent treatments were given indicates that cures can be effected in a little longer time by giving only one to three treatments daily.

11. Cases becoming chronic following open operation generally can be cured in a comparatively short time by instituting the closed method treatment, so making unnecessary a major secondary operation of the Schede, Eastlander, or Delorme type. (W. M. K.)

EISING, E. H. Willems' treatment of knee-joint injuries. New York Med. Jour., May 18, 1921.

The Belgian surgeon, Willems, in 1915 advocated the treatment of joint injuries which now bears his name. He applied the principles of debridement and primary suture to joints; but to this he added the revolutionary principle of immediate postoperative active motion. His early results were so successful as compared with the older methods of drainage and fixation that he was soon led to lay down the following sets of rules for the treatment of penetrating wounds of joints and of the knee joint in particular:

1. X-ray, to determine presence of fracture and location of foreign body.
2. Debridement of all damaged tissues surrounding the wound, external to the opening in the capsule of the joint, and removal of all blood clot in fascial planes.
3. Resterilization of all instruments before entering the joint cavity.
4. Removal of lacerated edges of synovial membrane, and opening joint sufficiently to proceed with intra-articular manipulations.

5. Removal of foreign body, clothing, and detached bone fragments. If the foreign body is imbedded it is chiseled away, following the tract to its end and removing all devitalized bone surrounding the tract. Manipulations are completed without putting the fingers in the joint cavity and as quickly as possible, because exposure and drying of the synovia conduces to ankylosis.

6. The joint is then washed out with nonirritating solution, such as Dakin's, or salt solution, followed finally by flushing with pure ether.

7. The joint capsule is then closed with plain catgut. Unless the effusion into the joint is frank pus, as in neglected cases, the synovial membrane is completely closed, disregarding the length of time that the injury has existed. The tissues external to the closed capsule need not be closed and are better left open, if the injury has existed longer than 12 hours. The external wound is loosely packed, and a dressing applied in such manner as not to interfere with active motion which is soon to be practiced.

8. As soon as the patient is sufficiently out of the anesthetic active motion is begun with the patient still lying in bed. Active motion is repeated every two hours during the day and night, and is considered one of the most important parts of the treatment in order to prevent ankylosis. Any interruption of the active motion sets the patient back and conduces to ankylosis. The active motion is accomplished with astonishingly little pain which soon disappears entirely.

The author tells us that "the management of the frankly septic cases, proved so by the presence of pus and by bacterial examination, is conducted in the same manner, with the exception that no attempt is made at primary suture. Neither the capsule nor the extra-articular structures are closed in any part. External and internal incisions open the joint on either side of the patella, and the joint is flushed with Dakin's solution, followed by ether. If tubes are employed at all they should not enter the synovial cavity. The external wounds are lightly packed with gauze. Active motion is begun as soon as the patient is sufficiently out of the anesthetic, and repeated day and night every two hours.

"The following day the patient is encouraged to walk without the use of crutches. This, of course, is not possible in all cases. Drainage is remarkably accelerated by the active motions, and on walking the purulent discharge is further forced out of the joint, the pus literally pouring out of the wound.

"The joint cavity is irrigated daily with Dakin's solution. After a week or 10 days the discharge becomes serous in character, and the wound may then be sutured. (W. M. K.)

SHAW, T. B. Some observations on primary venereal sores. Jour. Roy. Naval Med. Service, London, July, 1921.

In this article Surgeon Commander Shaw, Royal Navy, maintains that in no case should a patient suffering from a primary venereal sore be treated specifically until it has been demonstrated either

clinically or microscopically that such a sore is syphilitic. Such a procedure, in his opinion, could only be justified in those cases with sores which are clinically doubtful, and where the dark-field method for the examination of the serum of the sore for spirochaetes is not available. With dark field illumination a large percentage of venereal sores can be diagnosed accurately as chancroid or primary syphilis as the case may be.

The author considers prophylaxis at the time of exposure to infection and early diagnosis in all cases of venereal sores to be the most important weapons which can be used in any campaign against syphilis. He advocates the venereal prophylactic packet and emphasizes the importance of applying the calomel ointment before coitus as well as immediately afterwards. On the African station, where syphilis is very common, no venereal sores have been contracted by the men who have used the prophylactic packet as directed; of 30 cases of venereal sores which he discusses, none had made use of the preventive ointment.

He suggests the following procedure in cases of primary venereal sores:

- (1) All sores to be treated with saline dressings until diagnosed.
- (2) When sores are clinically specific, begin salvarsan treatment at once.
- (3) When sores are atypical of syphilis, examine by the dark-field method on at least three occasions on alternate days.
 - (a) If *T. pallidum* have been found, treat accordingly.
 - (b) If the diagnosis is chancroid, watch the case for three months to confirm this diagnosis, and have a Wassermann test carried out on three occasions at monthly intervals, the first test to be done one month after the appearance of the sore. (W. M. K.)

BELL, G. Resection of the small intestine for war wounds. Jour. Roy. Army Med. Corps, London, May, 1921.

The author, who served for three years as surgical specialist to a casualty clearing station in France, gives the following general indications for resection of the small intestine following gunshot injury:

- (1) Complete division of the gut in one or several places, as frequently resulted from machine-gun or rifle-bullet wounds.
- (2) Multiple wounds riddling a section of bowel, and especially when the lesions affected the mesenteric border.
- (3) Damage to the mesentery of such extent as likely to endanger the vitality of the associated gut.
- (4) Obvious gangrene of a damaged area—a rare occurrence.

(5) Severe multiple perforations involving possibly a considerable length of gut, necessitating much time spent in repair and likely to leave the restored part much lowered in vitality and unlikely to resume its functions. This is the class of case in which difference of opinion as to the best line of treatment was most likely to occur.

The strongest argument against resection undoubtedly is the amount of shock produced, and every care must be taken to guard against it by maintaining body warmth, by the use of large incisions to reduce manipulation and evisceration to a minimum, and by speedy yet thorough operating.

His experience leads him to the following conclusions:

The mortality rate of gunshot wounds of the small intestine *submitted to operation* and requiring resection will be about 50 per cent, usually more than less. In uncomplicated cases it may fall, under very favorable circumstances, to 25 per cent, while in complicated cases, and especially those associated with damage to the pelvis and pelvic viscera, it may rise to 75 or even 80 per cent. The mortality will be considerably greater in winter owing to the lethal effects of wet and exposure to cold and to the greater incidence of chest complications after operation. Bell would regard a recovery rate of one in three as very satisfactory under all seasonal conditions. The influence of the distance of the casualty clearing station from the firing line may be stated paradoxically as follows: The nearer the operating station to the firing line, the greater the operative mortality, but more cases will arrive fit for operation and more will be saved.

The selection of cases for resection depends to some extent on the bias and judgment of the individual operator.

The precise length of gut resected up to a limit of, roughly, one-fourth of the total length of the small intestine is not of major importance.

End-to-end union is the method of choice, but under certain circumstances lateral anastomosis may be preferable.

Emptying the upper segment of bowel, especially when distension has already set in, is of the greatest value and illustrates a cardinal principle in abdominal surgery. This and the occasional choice of lateral anastomosis both aim at the avoidance of distension and paralysis of the upper segment.

Hemorrhage is the most potent factor in causing a heavy primary mortality, and blood transfusion is of the greatest value in saving desperate cases brought to death's door by profound bleeding. This life-saving measure should prove of equal value in abdominal emergencies associated with grave hemorrhage in civil practice. (W. M. K.)

CUMMINS, S. L. **Tetanus in the British Army during the European War.** Jour. Roy. Army Med. Corps, London, May, 1921.

The conclusions which Colonel Cummins would draw from the information gained upon the subject of tetanus in the late war are as follows:

(1) The almost universal use of antitoxin for prophylactic inoculation has greatly diminished the incidence of tetanus as a complication of war wounds.

(2) There is reason to hope that, by following up and applying the new knowledge gained by Dr. Tulloch as to types of tetanus bacilli, it may be possible to still further increase the prophylactic efficacy of antitetanic serum in the future.

(3) The prophylactic use of antitoxin has not only reduced the incidence of tetanus, but has also led to a modification of the clinical type of the disease. Tetanus in inoculated persons tends to assume a milder form characterized by a longer incubation period and a greatly decreased case mortality. "Local tetanus," without trismus, is common.

(4) The improvement in surgical technique, notably the introduction of early excision of wounds, has favorably influenced the incidence, severity, and mortality in tetanus cases.

(5) There is as yet no statistical evidence to show that antitoxin has been valuable in the treatment of tetanus.

(6) Good results from serum therapy have been claimed by many surgeons, and recent experiments on animals show clearly that under controlled conditions serum therapy can cure tetanus even though administration had been withheld until the onset of spasm. It is therefore advisable to give every tetanus patient the chance of benefit from specific treatment.

(7) If serum is given, it should be given in large doses and as early as possible after onset. Intrathecal injections should be given, and these should be supplemented by intramuscular and subcutaneous inoculations. (W. M. K.)

TROPICAL MEDICINE.

MARSHALL, C. H. **New method of treatment of trypanosomiasis.** Jour. Trop. Med., June 16, 1921.

Based on the theory that some of the parasites are protected from the action of drugs given intravenously by assuming a secluded position in the central nervous system, the author has formulated a treatment of sleeping sickness by injecting blood serum into the spinal canal. This serum was in most cases obtained from the patients from

one-half to three hours after intravenous injection of neokharsivan, in several cases no intravenous injection was given, and in one case serum from another previously treated patient was used. This blood serum, he suggests, contains some trypanolytic antibody, which the cerebrospinal fluid, cut off from the blood stream by the disease, does not contain. Injection of blood serum containing the trypanolysin into the spinal canal is sufficient to kill the parasites either directly or by stimulating the formation of further antibodies.

The results of such serum treatment of over 50 cases appear to be better than any of the results hitherto obtained by repeated intravenous or subcutaneous injection of salvarsan, atoxyl, antimony, or other preparations. In the first case so treated only 20 minims of blood serum, obtained three hours after an intravenous injection of neokharsivan, was injected into the spinal canal. No other treatment was given. Twenty-seven months later she was quite well. Her blood and cerebrospinal fluid were negative and the glands in her neck, which had completely disappeared soon after the injection, had not reappeared. (E. U. R.)

McDONALD, W. M. Some aspects of differential diagnosis in tropical fevers. Jour. Trop. Med., June 1, 1921.

Diagnosis of malaria is often difficult because a large proportion of cases dose themselves with quinine for days before the doctor is called and in a certain proportion of subtertian cases the parasite is very rarely found in the peripheral blood. The finding of pigmented mononuclears does not show that the patient is suffering from malaria, but that he has suffered from it. Great care is needed to distinguish between true pigmented mononuclears and the many mononuclears and large lymphocytes showing granules in the cytoplasm found in other diseases. During a malarial attack the large lymphocyte is markedly increased rather than the true large mononuclear.

The diagnosis between paratyphoid fever and subtertian malaria most frequently is confusing.

His diagnostic pointers are summarized thus:

- | | |
|--|-----------------------|
| I. Absence of eosinophiles combined with leucopenia and a high Arneth index..... | Typhoid, paratyphoid. |
| II. Increase of large lymphocytes. Decrease of small lymphocytes and polynuclears. Eosinophiles normal. Anisocytosis and "brassy" cells. Arneth index normal or low..... | Malaria. |

III. Polynuclear leucocytosis 80 per cent or over.....	Septicæmia, abscess, pneumonia, meningitis.
IV. Moderate increase of polynuclears and eosinophiles. No anisocytosis.....	Filaria.
V. Apparently normal blood picture with high Arneth Index.....	Pulmonary tuberculosis.
VI. Marked eosinophilia.....	Ancylostomiasis and other worm infections.
	(E. U. R.)

SANDERS, A. A., and PRISTON, J. L. *Schistosomiasis in the Yangtse Valley.*
 Jour. Roy. Naval Med. Service, London, July, 1921.

The authors report eight cases of infection with *Schistosoma japonicum* contracted by officers of H. M. S. *Hawkins* while wading in the marshes adjacent to the banks of the Yangtse River on a snipe-hunting expedition.

Each patient after an incubation period of about two to three weeks presented, more or less, the following symptoms: Headache and malaise, slight sore throat and conjunctivitis, followed by some flatulence and abdominal distention, a persistent urticaria, diarrhea, and enlargement of the liver and spleen. Each patient had fever, lost weight, and experienced extreme lassitude, with pain the back and limbs.

Examination of the blood showed an eosinophilia amounting to from 50 to 65 per cent. Ova of the trematode were found in the feces in each case.

The authors used novarsenobillon intravenously in three cases without apparent effect. One case was treated with antimony tartrate intravenously, as recommended by Christopherson in the British Medical Journal, October 18, 1919, with some apparently beneficial effect.

As many ships of the United States Navy have occasion to go up the Yangtse, the liability to this infection should be kept in mind, and the officers and members of the crew warned of the danger of wading or swimming in the river. In January, 1914, Assistant Surgeon R. H. Laning, U. S. Navy, reported in the UNITED STATES NAVAL MEDICAL BULLETIN a series of cases observed on board the U. S. S. *Quiros* while serving on the Yangtse.

In some of Laning's cases the infection occurred while wading and in others from the river water used in washing down the decks of the vessel. (W. M. K.)

KOFOID, C. A., and SWEZY, O. On the prevalence of carriers of *Endamoeba dysenteriae* among soldiers returning from overseas service. Am. Jour. Trop. Med., January, 1921.

Medical literature of the last century bears witness to the ravages of dysentery in our Civil War and thereafter and of the efflorescence of dysentery and liver abscess in the United States after the Spanish-American and Philippine Wars and in Germany after the return of the troops from the Boxer expedition. The recent World War has afforded unprecedented facilities for the appearance of epidemics of dysentery and for the establishment of carriers.

Examination of 2,300 soldiers returning from overseas in Debarkation Hospital No. 3, at New York, revealed that 66.9 per cent were infected with intestinal parasites and in 297 (12.9 per cent) *Endamoeba dysenteriae* were found. These results rested, in the main, on single examinations. Infections were by no means confined to men from the front. Very few of them had dysenteric symptoms at the time of examination. Many, but not all, reported a history of diarrhea or a typical dysenteric attack, often recurrent.

It is evident from investigations here and in European laboratories that the war is returning into civil life great numbers of men who are carriers of pathogenic entamoebae.

It is noteworthy that infections with some of the other intestinal parasites are also increased in overseas men as compared with those in home service.

Cases of amoebiasis may exhibit abscess of liver, lungs, or brain, inflammation of the appendix, enlarged spleen resistant to quinine, long bone and joint pains, and obscure and rebellious types of skin infections.

Investigations also show that a larger number of carriers than has hitherto been suspected exists in the normal population in this country.

Increased attention is called for in all obscure intestinal cases to the possibility that *Endamoeba dysenteriae* is the etiological factor or accessory to the disease. (E. U. R.)

ALLMAND, D. Liverpool School of Tropical Medicine, Scientific Record. Ann. Trop. Med. and Parasit. April 27, 1921.

The Liverpool School of Tropical Medicine was founded in 1898 by the late Sir Alfred Lewis Jones, K. C. M. G., a prominent Liverpool shipowner. The school turned its attention early to research and in the summer of 1899 the first of its expeditions was despatched to Sierra Leone. During the next 14 years, or until the school's activities were interrupted by the World War, funds were collected to

equip and maintain more than 30 expeditions to the various tropical regions, including West and Central Africa, Brazil, and the West Indies.

In 1906 the school issued the first number of the *Annals of Tropical Medicine and Parasitology*. This publication had been preceded by a series of 21 *Memoirs*, mostly reports of the school's expeditions. Miss Allmand's article is replete with references to the school's publications and the record of research work of the school is dealt with under subjects. No attempt at a critical estimate has been made.

Malaria and sanitation.—The first expedition left England in July, 1899, for Sierra Leone, under the direction of Major Ross, for the purpose of studying malaria in man. A report of the work accomplished was published in 1902 as *Memoir II*. The investigators discovered two species of *Anopheles* in Freetown, namely, *A. funestus*, Giles, and *A. costalis*, Loew, and by dissection established the presence of blasts (sporozoites) in them. They pointed out the difference between *Culex* and *Anopheles*, and studied more especially the bionomics of the latter. At Freetown 6 of 29 *Anopheles* dissected showed parasites. Seventeen *Culex* gave negative results.

In 1900 a third malaria expedition was sent to Nigeria. This expedition, which was composed of Drs. H. E. Arnett, J. E. Dutton, and J. H. Elliott, spent six months in that country and in *Memoirs III* and *IV* reports were published of the work done, the former relating to malaria and the latter to filariasis. Seven of 281 *Anopheles* dissected at Bonny were found to be infected with malaria. "The observation made by Koch and by the Royal Society's Commission that native children are infected with malarial parasites to a large degree was confirmed. * * * It was also proved that quartan and simple tertian parasites exist in West Africa, a fact contrary to the experience of the Royal Society's Commission of the previous year. The bionomics of *Anopheles* were studied still further and a series of experiments in propagation carried out, confirming and elaborating the discovery of the previous expedition that the female mosquito requires a meal of blood both for fertilization and for the development of the ova. In their recommendations concerning prophylaxis they advocated (1) the segregation of Europeans at a distance of about half a mile (a principle already put forward by the Royal Society's Commission on Malaria, also at work in West Africa) and (2) the surface drainage of areas around their quarters. In an appendix they gave charts and descriptions of cases of hyperpyrexial fever, first described by Thompstone and Bennett. The hyperpyrexial stage lasts one to three weeks and is followed by very extended lysis. An exhaustive account was given in the second report (*Memoir IV*) of the mouth parts of the female *A. costalis*, and.

in an appendix by Theobald 25 mosquitoes were described of which 9 were new species, namely, *Stegomyia irritans*, *S. nigricephala*, *Culex duttoni*, *C. decens*, *C. pruina*, *C. invenustus*, *C. nebulosus*, *C. rima*, and *C. invidiosus*.

"In June, 1901, Major Ross and Dr. Logan Taylor went to Freetown to organize an antimosquito campaign. Reports on the progress of this campaign were published as Memoir V, parts 1 and 2, and later Ross issued a small book, Mosquito Brigades, and How to Organize Them.

"In September, 1901, Dr. Dutton went to the Gambia and inspected the conditions of health there, with the result that the colony organized measures similar to those in operation at Freetown (Memoir X). About 32 per cent of the infections examined showed quartan parasites, and about a third of the malignant tertian cases showed crescents. The simple tertian parasite was found three times only.

"Dutton noted the universal infection of canaries with *Halteridium*, which was also found in other birds.

"Of 24 *A. funestus* dissected, one contained sporozoites and one zygotes.

"*A. costalis* was found breeding in boats, street drains, wells, tubs, and barrels, and in tidal water containing 1.7 per cent salt, together with *C. thalassius*. It would appear that *A. funestus* and its varieties are rural mosquitoes, while *A. costalis* is essentially town-bred and capable of utilizing any small collection of water for breeding purposes."

"It was during his researches into the blood parasites of the Gambia that Dr. Dutton made a discovery of the highest scientific importance, namely, the identification for the first time of a trypanosome in the blood of a man, a patient of Dr. Forde. This parasite was subsequently shown to be the cause of sleeping sickness and was named *Trypanosoma gambiense*, Dutton, 1902."

"In September, 1902, by request of the Suez Canal Co., Maj. Ross went to Ismailia to investigate the causes of the prevalence there of malaria, and to recommend measures for its prevention. Anopheles and Culex were found breeding in water containing 0.9 per cent of salt. He concluded that the majority of Anopheles which caused malaria in Ismailia came from the marshes in immediate proximity to the town. Prophylactic measures based on his recommendations were commenced immediately. (Memoir IX.) In February, 1904, 16 months later, Prof. Boyce visited Ismailia; from statistics furnished in his report (Memoir XII) it appeared that the number of cases of malaria had fallen from 1,551 in 1902 to 209 in 1903."

"Ross and D. Thomson, working in Liverpool, published a paper entitled 'Some Enumerative Studies on Malarial Fever.' Some of the conclusions were: (1) No fever exists unless the parasites exceed from 500 to 1,500 per c. mm.; (2) the parasites tend to remain continuously in the blood in small numbers between the febrile relapses; (3) close correlation exists between the number of parasites and the amount of fever caused by them; (4) studies on quinine gave a numerical estimate of its effect, a few days' use of the drug reducing the parasites by from 50 per cent to 80 per cent; (5) crescents apparently require 8 to 10 days for development; quinine affects their numbers only by destroying the generating cells. Thomson, who subsequently investigated the life history of crescents, concluded that these do not live for more than a few days in the peripheral blood. They are replenished from surviving asexual forms, and quinine has no action on crescents but only on the asexual source of supply. He concluded that administration of quinine in doses of 20 grains daily for three weeks is almost certain to destroy both the asexual and sexual parasites. In a study of the leucocytes in malarial fever he stated that malaria could be diagnosed by the leucocytic formula.

"In 1912 J. G. Thomson and McLellan confirmed Bass's observations on the cultivation of malarial parasites. In 24 hours *P. falciparum* was found to undergo segmentation, the maximum number of merozoites counted being 30. In the case of *P. vivax*, 16 merozoites were produced. These cultures of *P. vivax* differed from those of *P. falciparum* in that there was no tendency to clumping. Further experiments in the cultivation of *P. falciparum* and *P. vivax* were made when it was noted that the optimum temperature for cultures was 38 C."

In 1912 Dr. David Thomson was sent to Panama to study certain malarial problems. He noted that the gametes in malignant tertian malaria develop chiefly in the bone marrow and in the spleen, the period of incubation being about 10 days.

In 1917 the school was asked by the war office to undertake investigations into the treatment of malaria.

"No case was considered to be malaria unless parasites were found. The results of treatment were in all cases controlled by daily microscopical examinations combined with the clinical record.

"*Simple tertian.*—The investigators established: (1) That intramuscular injection of quinine bihydrochloride was an effective method of treating a malarial attack, a matter which had been one of considerable dispute in the medical press just previous to this work. (2) That for the palliative treatment of malaria—that is, for keeping a person free from relapses over long periods—it was better to give a

certain total amount of quinine on each of two consecutive days than on each of six days in the week: Thus 60 grains administered as 30 grains for two days gives a better result than the same amount administered as 10 grains for six days. (3) The best palliative result was obtained by administration of 45 grains on each of two consecutive days weekly over a period of two months. (4) They found that a certain treatment may give a certain 'curative' result on one occasion, while the same treatment repeated on another occasion might give a quite different result. (5) Novarsenobillon was found to be as efficacious as quinine in the treatment of paroxysms, but its curative effect, like that of quinine, was practically nil. (6) The best 'curative' result was obtained by the administration of *Liquor arsenicalis*, minims 30, daily over a period of eight weeks in combination with two initial intramuscular injections of quinine bihydrochloride, grains 15, on two days only."

"The intravenous injection of quinine was found to have no real curative effect."

The relapse period after treatment of 800 simple tertian cases was noted. Of those patients that relapse the majority do so in the first 20 days after cessation of treatment.

"*Malignant tertian*.—Neither a single nor a series of six intravenous injections of quinine bihydrochloride (grains 10 to 15) caused the disappearance of parasites, either trophozoities or gamets, from the peripheral blood, whereas in the case of simple tertian the disappearance was rapid. Under quinine treatment, grains 30 to 45 daily, crescents did not persist in the peripheral blood in the majority of cases for more than three weeks. How long they persist without quinine was not determined."

"In 1907 the nineteenth expedition, consisting of Dr. J. O. Wake-lin Barratt and Dr. Warrington Yorke, was dispatched to Nyasaland to study blackwater fever. The object of the investigators was to trace out some of the internal processes, the terminal event of which is the appearance of blackwater, believing that in that way many obscure points in connection with the causation and treatment of the condition would be cleared up. The first point was to determine the action of quinine, acid, and alkali upon the red cells during blackwater fever. They found that hemolysins, present in the blood, played no part in the production of blackwater. It was considered that the suppression of urine is due to a mechanical blocking of the renal tubes by the formation of large, firm, coarsely granular casts in the ducts of Bellini. In a later study, on the suppression of urine in blackwater fever, Yorke and Nauss reinvestigated the mechanical theory and found that it is considerably facilitated by any factor which tends to lower the blood pressure, and by that means the

secretion of water by the glomeruli, but that if the blood pressure is kept up by the injection of saline solutions, the tendency to suppression is decreased. Arising out of these latter experiments, the passage of hemoglobin through the kidneys was studied by Yorke, who was led to consider that hemoglobin is excreted by the renal epithelium rather than filtered through the glomeruli, and that the amount of hemoglobin eliminated into the urine is dependent upon the activity of the epithelium lining the renal tubules.

"It was shown by Simpson that the hemoglobin liberated from the red cells in malaria escapes in larger quantities by the feces than by the urine. The study of hemoglobin metabolism in blackwater fever was continued, and a report made on the quantitative estimation of urobilin in the excreta. In later observations on hemolysis in malaria, Simpson concluded that the serum of malarial patients may possess the power of hemolysing normal red-blood cells. The hemolytic effect could not be obtained at all periods of the paroxysm, nor in every case; it appeared to be produced at the period of sporulation, and rapidly disappeared. Simpson and Edie, observing the excretion of urobilin in animals and man, found that an increase may occur after the administration of quinine in doses of 10 to 30 grains a day, and that a similar result follows injection of blood pigment or hemolytic drugs.

"Experiments were devised by Barratt and Yorke for examining the relation of bile pigments to hemoglobin. Experimenting with rabbits, they found that consequent upon intravenous injection of hemoglobin solution there was a distinct and immediate increase not only in the concentration of the bile pigment but also in the amount of bile pigment excreted. Two hypotheses were advanced to explain this increase—(1) that the hemoglobin injected is actually converted by the liver into bile pigment, or (2) that it merely stimulates the liver cells to an increased production of bile pigment.

"Stephens recorded that blackwater fever occurred in 11 of 22 of the United States. * * * An analysis of 95 cases showed that when the blood was examined before the onset of blackwater, malarial parasites were present in 95.6 per cent of cases, whereas on the following day the remarkable fall to 17.1 per cent was the result. On the day of blackwater itself the figure was 61.9 per cent."

"*Trypanosomiasis*.—In view of the great importance of the discovery of the trypanosome in man by Dr. Dutton in 1901, described and named by him *T. gambiense*, an expedition was sent out to the Gambia and French Senegal in September, 1902, in charge of Dr. Dutton and Dr. J. L. Todd, for the study of trypanosomiasis. While these investigators were at work abroad the first case, that of a European who had returned with Dr. Dutton in 1901, remained in

Liverpool, and Dr. Annett infected monkeys and 25 per cent of tame rats successfully, but did not succeed in infecting tame mice, rabbits, or guinea pigs. One of the infected monkeys died, but the other recovered, and no parasites could be found by subinoculation into rats. The results of his work were incorporated in the report of the expedition. (Memoir XI.) On reaching the Gambia, 1,043 natives were examined, the majority of whom were children or young adults and apparently healthy, 6 were found to be infected. Trypanosomes were also found in the blood of a quadroon. Clinical descriptions were furnished in the report of these first 8 cases of trypanosomiasis, of which those of the European and the quadroon terminated fatally after a duration of about 18 months. Of 36 horses examined, 10 were found to be infected with trypanosomes. Transmission experiments were made with *Glossina palpalis* and later with *Stomoxys*, but with negative results. A series of inoculations were made of the human and equine trypanosomes in experimental animals, the results of which led Dutton and Todd to the conclusion that the parasites were not of the same species; the Gambian horse trypanosome was subsequently named *T. dimorphon*.

"Prior to the return of this expedition, the discovery of trypanosomes in the cerebrospinal fluid of cases of sleeping sickness in Uganda by members of the Sleeping Sickness Commission of the Royal Society caused the subject of trypanosomiasis to assume great importance. At the invitation of King Leopold, an expedition was sent in 1903 to study sleeping sickness in the Congo Free State, consisting of Drs. Dutton, Todd, and Christy. The results of these investigations were incorporated in Memoir XIII, and illustrated the occurrence and distribution of trypanosomiasis, described the symptoms of the disease in all its stages, both in Europeans and natives, and showed how sleeping sickness, so called, is related to trypanosomiasis as a symptom of that disease.

"They first stated that they were unable to find any difference between the trypanosome occurring in cases of sleeping sickness in the Congo and *T. gambiense*. There was a very evident clinical connection between cases with only very slight symptoms (trypanosoma fever) and advanced cases of 'sleeping sickness.' (In 25 of 38 cases they found parasites in the cerebrospinal fluid, adopting Quincke's method of diagnosis by lumbar puncture. They infected rats, mice, rabbits, guinea pigs, and studied the morphology of the Congo and Gambian trypanosome in these animals. They noted that about 50 per cent of such inoculations failed, and that they did not succeed in infecting two dog-faced monkeys (*Cynocephalus* species).

"In the combined areas of Leopoldville, Boma, Matadi, and the Cataract region, among a total of 1,172 persons examined, 8.8 per

cent were infected, while of these latter 55 per cent had been diagnosed as cases of sleeping sickness. In the Gambia the previous expedition had examined 1,043 natives, of which 6 only harbored trypanosomes, and showed no definite symptoms.

"Numerous lumbar punctures were made, and it was noted that in many cases the trypanosomes never find their way into the cerebrospinal fluid, and in those cases in which they do they are more likely to be found toward the termination of the disease; if they gain access early in the disease, mania and other cerebral symptoms are more likely to be prominent, but their entrance is in no way correlated to the commencement of the fever or other symptoms. In two later papers on gland puncture in trypanosomiasis, the observers favorably compared this with other methods of demonstrating the presence of parasites. Following the work of Greig and Gray, they concluded that by gland puncture cases infected with trypanosomes could be recognized at a much earlier period than hitherto. They also for the first time observed a phenomenon frequently seen in cases of trypanosomiasis, namely, autoagglutination of the red cells. The distribution of sleeping sickness in the Congo was subsequently studied, it being concluded that the increase during recent years was due in a great measure to the increase in travel following the opening up of the country. In a subsequent report the trypanosomiasis of cattle was dealt with. The investigators found that this disease was very widely distributed in the Congo, the infecting parasite being usually *T. dimorphon*. It was also observed that domestic animals probably acquire a relative immunity to some strains of trypanosomes, and may even recover spontaneously. Trypanosomes were found in horses, mules, and donkeys as well as in cattle, and also in *Tragelaphus scriptus*.

"Thomas, assisted by Linton and Breinl, established by a long series of experiments that trypanosomes found in (a) the cerebrospinal fluid of Uganda sleeping sickness cases, (b) the cerebrospinal fluid and blood of Congo sleeping sickness cases, (c) the blood of Congo 'trypanosome fever' cases, and (d) the blood of Europeans infected in the Congo were identical in animal reactions and morphology with *T. gambiense* Dutton. It was also found (1) that the periodicity of the parasite is a prominent feature, both in man and beast; (2) that the passing of a strain from a susceptible into a very resistant animal does not attenuate the organism, and that the morphological character is retained after being passed through many hundreds of animals for nearly three years; (3) that the parasites in an animal may sometimes become more virulent, that such a strain may be particularly virulent for one species of animal, and that the more rapid infection is not due to the inoculation of a greater number of parasites than usual. In addition to *T. gambiense*

and *T. dimorphon*, other pathogenic trypanosomes were procured, and comparisons made between the above organisms and *T. evansi*, *T. brucei*, *T. equinum*, and *T. equiperdum*. Cultivation of the different parasites was also undertaken with success. Breinl gave a detailed account of the post-mortem changes in four cases of sleeping sickness.

"Extensive research was conducted into the treatment of trypanosomiasis, with the result that two drugs only were found to be of any value in the disease, namely, arsenic and 'Trypanroth.' Thomas introduced atoxyl, a meta-arsenic anilin compound, a drug which causes no pain on subcutaneous injection and may be administered over a period of many months. He stated that it was 'the only remedy at present giving a prospect of a cure.' Although atoxyl would almost invariably cause the trypanosomes to disappear from the peripheral blood, yet since the parasites frequently reappeared, it seemed possible that they might exist somewhere else in the body of their host in a form uninfluenced by the drug. Series of experiments were therefore undertaken by Benjamin Moore and Nierenstein, of the biochemical department, and Todd. They found that in the treatment of rats infected with *T. brucei*, the administration of atoxyl, followed by bichloride of mercury, gave better results than treatment by atoxyl alone."

"In May, 1907, the eighteenth expedition of the school, consisting of Dr. Allan Kinghorn and Mr. R. E. Montgomery, was dispatched to Rhodesia and British Central Africa to study the trypanosomiasis of men and animals. It was found that sleeping sickness had already invaded northeastern Rhodesia, the first case being seen in the Lupula division, adjoining the frontier of the Congo. Glossina surveys were made, and the suggestion first advanced that *Gl. palpalis* and *Gl. fusca* were not the only transmitters of the disease, *Gl. morsitans* having also been observed in infected areas. Gland palpations were made in 26,928 natives, of whom 17.05 per cent were found to have palpable glands. The percentage of positive punctures was 77.7. The workers confirmed the belief of Dutton and Todd that gland palpation, combined with puncture, is a most useful measure, being a practical method of isolating infected natives and preventing any rapid extension of the disease. It was found that there were between 50 and 60 known cases of sleeping sickness in the country. The mode of introduction and prophylaxis of the disease were studied, and regulations drawn up by this expedition were adopted and enforced by the Government.

"Concurrently with the research into human trypanosomiasis the expedition pursued an inquiry into trypanosomiasis of domestic stock in northwestern Rhodesia, in the course of which it was established that the disease was very prevalent in that area, and was due to *T. dimorphon*, *T. vivax*, and a trypanosome morphologically allied to

T. brucei. These trypanosomes could be transmitted by *Gl. morsitans*, by *Stomoxys calcitrans*, and by a species of *Lyperosia*. The question of association of big game and *Gl. morsitans* is entirely dependent upon the nature of the country and its flora, that the association with the fauna is largely fortuitous, and that a perpetual supply of mammalian blood is not imperative, at least to its temporary existence."

"In 1911 the twenty-seventh expedition of the school, consisting of Dr. J. L. Todd and Dr. S. B. Wolbach, was dispatched to the Gambia to investigate sleeping sickness.

"In the course of this investigation, 12,298 persons were palpated, and the observers put on record their opinion that gland palpation and puncture was by far the best procedure for the diagnosis of trypanosomiasis. It was found that at least 0.8 per cent of the population of the Gambia was infected with trypanosomes. Strong recommendations were made for the control of the disease in the Gambia, including a continued examination of the whole population, the establishment of villages for isolation, observation, and treatment of cases, and the appointment of a special staff for the administration and execution of these projects.

"In 1911, at the request of the British South African Co., Dr. Kinghorn and Dr. Yorke were sent to Rhodesia (Luangwa Valley) to study sleeping sickness. It was quickly placed beyond doubt that *Gl. morsitans* was the carrier of the human trypanosome. The investigators inoculated rats from 12 cases of human trypanosomiasis, 11 of which occurred in villages in the Luangwa Valley. In every instance they observed the posterior displacement of the macronucleus, characteristic of the trypanosome described by Stephens and Fantham; the animal reactions agreed in all respects with those obtained from infection with *T. rhodesiense*. Elaborate transmission experiments with both wild and laboratory-bred *Glossina morsitans* were successfully carried out in rats and monkeys; the duration of the cycle in the fly (approximately 14 days) was found to be shorter than in experiments of previous investigators with *Gl. palpalis* and *Gl. morsitans*. It was observed that an infected fly retains the power of transmitting the disease during its life, and is infective at each meal, but that mechanical transmission does not occur if a period of 24 hours has elapsed since the infecting meal. Certain species of buck, viz, water buck, hartebeest, mpala, and wart hog, were found to be infected with the human trypanosome, as well as a native dog."

The chief reservoir of the human trypanosome was found to be the antelope.

"J. G. Thomson succeeded in cultivating *T. rhodesiense* by the use of a modification of the Novy-MacNeal-Nicolle medium. * * * In a subsequent investigation with J. A. Sinton, Thomson success-

fully cultivated *T. gambiense*, as well as *T. rhodesiense*, the former for a period of 37 days, the latter for 21 days only.

"The thirty-second expedition of the school, consisting of Drs. Yorke and Blacklock, was dispatched to Sierra Leone in 1914. Research was undertaken into the bionomics of *G. palpalis* in Sierra Leone, with special reference to its pupal habits. It was found that the breeding grounds of *G. palpalis* are not so strictly limited to the immediate vicinity of water as had hitherto been believed. Mangrove swamps do not constitute a breeding ground. The pupæ do not hatch when subjected to daily flotation on sea water. The ground around the trunk of oil palms which have not been stripped of their lower petioles constitutes an excellent breeding place for *G. palpalis*; they can breed in localities in which practically the only tree is the oil palm. A study of the food of *G. palpalis* in the Cape Lighthouse Peninsula, Sierra Leone, showed that about 8 per cent of the wild *G. palpalis* in that district contained recognizable red-blood cells, 7 per cent of mammalian origin, and 1 per cent nucleated red cells of unknown origin. Neither shed blood nor other fluid which is exposed (not covered by a membrane) can be imbibed by *G. palpalis*. Fluids, such as solutions of sugar, sodium, chloride, etc., protected by a membrane (e. g., thin rubber sheeting), were taken up, but less quickly and readily than blood. It was thought that in nature *G. palpalis* may, under certain conditions, take up fluids other than blood. The human trypanosome (*T. gambiense*) was discovered in an ox in Sierra Leone, thus demonstrating that domestic stock forms a reservoir for the virus of sleeping sickness."

Yellow fever.—In 1900, the fourth expedition, consisting of Drs. H. E. Durham and Walter Myers, went to Brazil to study yellow fever. Dr. Myers died of the disease in January, 1901, while Dr. Durham, who also contracted it, recovered and published a report of the work of the expedition in 1902.

Relapsing fever and spirochætes.—By the death of Dr. Dutton from tick fever while serving with the Congo expedition, the school suffered the loss of one of its most brilliant workers, who, although only 29 years of age, had already won a recognized position throughout the scientific world. Toward the end of 1904, Dr. Dutton and Dr. Todd had reached Stanley Falls, and they were able to demonstrate independently the cause of tick fever in man, a discovery made a few weeks previously by Ross and Milne in Uganda. Further, they were able to prove the transference of the disease from man to monkeys by means of a particular species of tick. In Todd's report of this discovery (Memoir XVIII) clinical descriptions were given of 12 native and 2 European cases (the last two being those of the investigators themselves), all of whom were infected with a spirochæte, thought at first to be *S. obermeieri*. Observations were made

upon the distribution and bionomics of the human tick in the Congo, and included in the report was a description of *Ornithodoros moubata* by Prof. Newstead.

"Research was proceeding at Runcorn upon material brought back from the Congo by Dr. Todd, while Dr. Breinl, invalided home from the fifteenth expedition, carried out with Dr. A. Kinghorn extensive studies on 'tick fever' and 'relapsing fever.' Observations were made on the animal reactions of the spirochæte discovered in the Congo cases of human tick fever, and brought to England in infected monkeys and ticks. In the course of these experiments, infection was produced not only in monkeys, but also in a horse, a dog, rabbits, guinea pigs, rats, and mice. This fact caused the observers to conclude that the organism was distinct from *Spirochaeta obermeieri*, pathogenic hitherto to monkeys only. Further experiments were undertaken confirming this conclusion; and the new species was given the name of *Spirochaeta duttoni* (Breinl and Kinghorn, 1906, Memoir XX). Studies were made of this organism (Memoir XXI), in the course of which a clinical comparison was made between African tick fever and European relapsing fever, and the research into the animal reactions of this spirochæte in various animals amplified and completed."

"*Amoebiasis*.—Research into the amoebæ parasitic in the human intestine was undertaken by Fantham, and a study commenced of the life history of *E. coli* as seen in cultures.

"Carter, Mackinnon, Matthews, and Smith conducted extensive researches into the protozoal findings in cases of amoebic dysentery. In their first report they recorded the results of 4,334 examinations of 910 patients suffering from this condition. Protozoal infections were discovered in 44.2 per cent; *E. histolytica* was found in 10.3 per cent of the cases; *E. coli* in 25.4 per cent; *G. intestinalis* in 18.6 per cent; *T. intestinalis* in 1.2 per cent; and *C. mesnili* in 2.7 per cent. Their second report recorded similar examinations of 1,713 cases of dysentery. Stress was laid upon the necessity for repeated examinations of each patient, as cases found negative the first and second times may prove on further examination to be *E. histolytic* carriers. The subject of 'negative periods' (absence of vegetative forms and cysts) in infected cases was also dealt with. A third report of this investigation appeared in Annals, Volume XIII, page 83. Yorke and the above-mentioned observers examined for intestinal protozoa 344 persons who had never been out of England. Of this number 206 were healthy young men of about 18 years of age who had recently entered the army. A single examination of each of these cases revealed the interesting fact that 3.9 per cent were infected with *E. histolytica*."

"Helminthiasis.—In 1917, at a veterinary hospital attached to a remount depot in the neighborhood of Liverpool, Yorke and Macfie started an investigation into the parasitic worms causing a heavy mortality amongst horses recently imported from America. The parasites belonged for the most part to various genera of the family Strongylidae, and in the course of their study Yorke and Macfie described eight new species and one new variety, viz., *Cylicostomum longibursatum*, *C. minutum*, *C. pseudocatinatum*, *C. pateratum*, *C. tridentatum*, *C. triramosum*, *Cylindropharynx rhodesiense*, *Gyaloccephalus equi* and *Cylicostomum nassatum*, Looss, var. *parvum*."

"Filariasis.—The second part of the Report of the Third Malarial Expedition was devoted almost entirely to Filariasis. Eight new species, found during the examination of a large number of West African birds, were described, namely, *F. eypseli*, *F. spiralis avium*, *F. fusiformis avium*, *F. spiralis avium major*, *F. falciformis*, *F. bibulbosa*, *F. capsulata* and *F. shekletoni*. Observations were also made on human filariasis in West Africa, it being found that throughout the whole of that area the natives appeared to be infected with *F. nocturna*, *diurna* and *perstans*. With regard to the two first species, the majority of the cases encountered were atypical, in that embryos were either never absent from the peripheral blood, or the maximum did not occur at midday and midnight or thereabouts according to the species. Among the former cases there were many showing decided periodicity, and, among the latter, the hour at which the maximum number was present varied considerably. In some cases two maxima during the 24 hours were indicated. In the examination (day blood) of 390 natives of all ages up to about 18 years, one case only, aged 11 years, was infected. The observers succeeded in infecting *A. costalis* (proboscis) with *F. nocturna*. They considered that the weight of evidence was on the side of the identity of *F. nocturna* and *F. diurna*, but that many points remained to be cleared up before the question could be settled.

Miss Allmand concludes her article by a review of the scientific researches of the school in entomology and protozoology. (w. m. k.)

PATHOLOGY, BACTERIOLOGY, AND ANIMAL PARASITOLOGY.

JENKINS, C. E. Notes on cultivation of gonococcus. Jour. Path. and Bacteriol. April, 1921.

The author found whole blood agar most satisfactory. It was made by adding 0.5 c.c. fresh blood to 4.5 c.c. agar in each tube—tubes being kept at 55 C. until blood is added, when they are sloped in the usual manner. The optimum temperature for growth of the

gonococcus was found to be 35 C. to 36 C., in moist air. The moisture was provided by placing a dish of water in the incubator. A note is made of variation of temperature between the upper and lower parts of the incubator. Reaction + 0.4 or + 0.5 was found to be best.

The writer states that various authorities have recommended from 1.2 per cent to 3 per cent agar, but he prefers to test each batch of agar for its "solidity." He does this by placing varying amounts of agar in eight tubes; in the first tube 5 c.c., in the second tube 4.6 c.c., and so on through the series, 0.4 c.c. less of agar in each tube. He adds sufficient hot saline to each tube, beginning with 0.4 c.c. in the second, to make up to 5 c.c. in each tube. He shakes the tubes well and slopes them. The tubes are left for 30 minutes in sloping position and then set upright in order of dilution from left to right for 15 minutes. He marks the tube having most saline but showing no collapse after standing upright. He then selects the third or fourth tube from the marked tube in the direction of least dilution with salt solution.

The batch of medium is then diluted, using pepton with reaction of + 0.5 instead of saline solution. It is said that this gives a medium which is sufficiently soft to permit of rapid growth of the gonococcus. (G. F. C.)

CRAIG, C. F. The classification and differential diagnosis of the aestivo-autumnal malaria plasmodia. Am. Jour. Trop. Med., March, 1921.

This author states that Grassi, Feletti, Mannaberg, Mason, Marchiafava and Bignami recognize two or more species of aestivo-autumnal or pernicious plasmodia.

He presents an able discussion of the evidence that there are at least two distinct forms differing in morphology, in length of life cycle and in clinical manifestations. He uses the name *Plasmodium falciparum* for the form with a life cycle of 48 hours and the name *Plasmodium falciparum quotidianum* for that with a life cycle of 24 hours. The latter he advanced as a subspecies in 1909 and he now considers the evidence almost sufficient to entitle it to rank as a distinct species. (E. U. R.)

EAGLETON, A. J., and BAXTER, E. M. The virulence of diphtherialike organisms. Brit. Med. Jour., May 28, 1921.

The authors offer the following technique, which has been found of great value in the Wellcome Physiological Research Laboratories:

"Two guinea pigs are used for each test; both must be partially white.

Protecting dose.—One animal is given 500 units of diphtheria antitoxin by intraperitoneal injection on the day preceding the test. This animal acts as a control.

Preparation of inoculum.—The test strains and a known virulent diphtheria bacillus are grown 18 hours on Loeffler slopes, emulsified in saline, diluted and standardized by opacity, so that the suspension contains approximately 50,000,000 organisms per cubic centimeter.

Injection of suspensions.—White-haired portions of the guinea pigs are depilated with calcium sulphide paste, and into corresponding skin areas of the two animals is injected 0.2 c. m. of each suspension. The injections are strictly intradermal and at least half an inch apart. On each pair of animals 8 or 10 strains are usually tested, including the control virulent.

Following dose.—Four or five hours later the animal which was not given a protecting dose on the previous day receives 125 units of diphtheria antitoxin intraperitoneally.

Readings are taken for the next three days.

In the case of a virulent diphtheria bacillus the control animal shows nothing or a faint transient flush; the other animal shows a definite rose-red swelling, which becomes more marked at each successive reading, and may terminate in slight necrosis. An avirulent diphtherialike organism gives a negative result with both animals. If the test culture is contaminated with streptococci the result may be obscured by a reaction in both animals, but this does not always happen." (W. M. K.)

CHEMISTRY AND PHARMACY.

MASON, E. H. A note on the absorption of calcium salts in man. Jour. Biol. Chem., Vol. XLVII, 1921.

Relative to the ingestion of calcium salts as hemostatics, Mason determined the effect upon the calcium of the blood plasma of single 5-gram doses. Calcium lactate (8 trials) produced little increase, either alone, in dilute hydrochloric acid, or in cod liver oil. Calcium chloride alone produces increases of 10 to 40 per cent (4 trials); with dilute HCl, increases of 10 to 20 per cent (2 trials). (C. W. O. B.)

SUMNER, J. B. and GRAHAM, V. A. Dinitrosalicylic acid: A Reagent for the estimation of sugar in normal and diabetic urine. Jour. Biol. Chem., 1921, XLVII.

The authors introduce a new colorimetric determination, using dinitrosalicylic acid, for the preparation of which directions are

62080—21—12

given. The technique is very simple, except that a control for such substances as uric acid and polyphenols must be made with "low" (definite limit not given) and normal sugar contents, or results may be more than 100 per cent too high. In view of the control, the method probably offers no real *clinical* advantage over the usual Benedict or Folin-Peck methods. With 10 normal urines there were values obtained for total sugar of 0.019 to 0.149 per cent (average of 0.067), for fermentable sugar of 0.019 to 0.109 per cent (average of 0.055), and for unfermentable sugar an average of 0.012 per cent. (C. W. O. B.)

KOBER, P. A., and KLETT, R. E. Further improvements in the nephelometer-colorimeter. Jour. Biol. Chem., XLVII., 1921.

"The advantages of the new improvements are: (1) The elimination of the fatigue and annoyance due to stooping to read the scale of Duboscq instruments; (2) an enlarged and well-illuminated scale read through an eyepiece of the same focal length as the telescope; (3) a more convenient position for the milled heads operating the stages allowing for resting of the operator's arms; and (4) a micrometer arrangement for setting the zero point which can be locked in any position." (C. W. O. B.)

DENIS, W. On the substitution of turbidimetry for nephelometry in certain biochemical methods of analysis. Jour. Biol. Chem., XLVII, 1921.

Based upon results obtained in three analytical procedures (Lyman's for calcium in blood, Bloor's for fat in blood and milk, and Pouget and Chouchak's strychnine molybdate method for phosphates as modified by Kober and Egerer and Bloor), the author considers the use of the ordinary Duboscq colorimeter, in a dark or semidark room, equal in accuracy to the nephelometer as well as superior, inasmuch as larger variations in concentrations between standard and unknown are permissible and the instrument is more generally available. The first method above permits a variation of 50 per cent if the final volume of 100 c.c. contains 0.75-0.35 mg. calcium; the second a variation of 60 per cent with fatty acid concentrations within range of 8-2 mg. per 100 c.c.; for the third, the optimum concentration is 0.12 to 1.2 mg. H_3PO_4 per 100 c.c. Turbidimetry is already employed by Folin and Denis for albumin in urine, and by Denis and Ayer for cerebrospinal fluid. (C. W. O. B.)

GROSS, E. G., and STEENBOCK, H. **Creatinuria.** Jour. Biol. Chem., XLVII, 1921.

Experimenting upon the pig, it was found that feeding with arginine (or its precursor, casein) augments creatin excretion, as does cystine (if urine remains acid). Ingestion of sheep's thyroid with a nitrogen-free diet caused marked stimulation of creatin formation, which was accentuated upon addition of casein to the diet. Possibly the thyroid mechanism thus explains why protein feeding produces creatinuria in women but not in men. (C. W. O. B.)

McKILLIPS, G. M., DE YOUNG, I. M., and BLOOR, W. R. **The distribution of phosphoric acid in the blood of normal infants.** Jour. Biol. Chem., XLVII, 1921.

Sex showed but little influence. Corpuscles gave practically adult values, but, in terms of H_3PO_4 in mg. per 100 c. c., the plasma gave the following average results:

	Adult.	Infant.
Total	34.0	29.7
Acid-soluble	11.4	16.5
Inorganic	9.9	9.6
Lipoid	23.5	14.8
Organic	1.5	7.0

(C. W. O. B.)

BLUNT, K. and DYE, M. **Basal Metabolism of normal women.** Jour. Biol. Chem., XLVII, 1921.

The daily variation for each subject ranged from 7.4 to 28.8 per cent. There was no relationship between the minimum pulse rate and the basal metabolism. Menstruation produces no definite change in basal metabolism or in pulse rate. (C. W. O. B.)

STEENBOCK, H., SELL, M. T., and BUELL, M. V. **Fat-soluble vitamine.** Jour. Biol. Chem., XLVII, 1921.

Using rats to determine the relation between the vitamine and yellow pigment, it was found that cod-liver oil has a very high concentration of the former, but very small amounts of the latter. The concentration in butter fat generally parallels the pigment, but not necessarily closely, in which respect they are resembled by beef fat and egg yolk. The vitamine withstands severe methods of saponification, thus indicating that it is not a fat and probably not an ester. (C. W. O. B.)

MEANS, J. H., and WOODWELL, M. N. **Remarks on standards for normal basal metabolism.** Arch. Int. Med., May 15, 1921.

Indirect calorimetry, as a result of the pioneer work of DuBois and his collaborators, has become generally adopted in the last two or three years, in this country at least, as a routine method of labora-

tory diagnosis in certain diseases, especially in those of the ductless glands. As a functional test of the thyroid gland, the level of the basal metabolism is being determined at the present time in many clinics.

Clinicians may well be puzzled in choosing between the several methods that have been proposed for the purpose by various investigators. It is with the hope of throwing light on this phase of the subject that the present communication is made.

METHODS FOR PREDICTING THE BASAL METABOLISM OF NORMAL PERSONS.

Body-surface law.—The search for suitable criteria has centered chiefly about the so-called body-surface law of Rubner. The principle embodied in this law, which is that the basal metabolism is a simple function of the body surface, has been disputed by Dreyer, and as Boothby and Sandiford have recently pointed out, such objections, in a strict sense, are valid. Nevertheless, in a broader sense, Rubner's law has never been disproved, and while it may be true that the basal metabolism is not strictly proportional to, nor, perhaps, determined by, surface area, the fact remains that it is more nearly proportional to area than to any other one factor so far discovered.

DuBois linear formula.—It was to overcome just such faults in formulas that the DuBois formulas were devised. By the first of these, the so-called linear formula, the body surface is calculated from about 19 measurements of the body. The principle is to divide the body into parts and calculate the area of each part from its length multiplied by its average circumference and by a constant. The sum of the parts gives the total body-surface area. The constants for the several parts were derived from the areas of the parts as determined by actual casts. Casts were made of the bodies of 10 individuals of widely different shapes. It was found that the area as calculated by the linear formula varied on an average less than 1.7 per cent from the areas as actually measured from the casts.

Du Bois height-weight formula and chart.—In 1916 the Du Boises brought out a still simpler formula, the so-called height-weight formula. This was worked out from the results obtained in a large series of persons by the linear formula, and enables one to obtain the surface area directly from the height and weight. The height-weight formula, which has been still further simplified into the height-weight chart, is the method in use in most clinics to-day. In this clinic as in other clinics the calories per square meter per hour are compared with the Sage Institute normal standards. These standards have been changed slightly from time to time; the most

recent ones will be found in the paper of Aub and Du Bois published in 1917.

Harris-Benedict prediction tables.—The Harris-Benedict Method takes the form of a series of tables in which are given prediction figures of what the metabolism should be in a normal adult of either sex and of any height, weight, or age. The figures were developed from the data of observations made on 103 women and 136 men at the Carnegie Nutrition Laboratory in Boston.

The Dreyer formulas.—The Dreyer formulas are several. They take into consideration one less factor than either the Du Bois or the Harris-Benedict. The last two take into consideration height, weight, age, and sex. The Dreyer formulas are based on age, sex, and one other factor, either weight, trunk length, or circumference of thorax. Dreyer derived his constants from the Harris-Benedict data.

In predicting the metabolism of normal men it was found that the three methods gave about equally good results; that in predicting that of obese subjects the Harris-Benedict method gave slightly better results than the other two. In the matter of deviations from normal in patients with myxedema, toxic goiter and the like, it was found that the information gained by the three methods was again strikingly similar.

SUMMARY AND CONCLUSIONS.

1. The accuracy of prediction of the basal metabolism of normal men by the Du Bois height-weight surface area method, the Harris-Benedict multiple prediction tables, and by the Dreyer body-weight formula, have been compared. It was concluded that the average deviation was essentially the same by each, though the Du Bois deviations tend to run about two points or more lower than either of the others.

2. The same study was made in a series of six obese subjects. It was found that with them the Harris-Benedict method gave a slightly closer prediction than the other two. In general, however, the deviations by all three methods were within what may be considered a normal limit of variation in all of the six subjects. This furnishes confirmation of the conclusions drawn in earlier papers that there is no fundamental change in basal metabolism in simple obesity.

3. In abnormal subjects patients with hypothyroidism or hyperthyroidism, for example, it was found that the deviations by the three methods were essentially parallel, though on an average the Harris-Benedict deviation tended to be about 6 per cent higher and the Dreyer about 7 per cent higher than the Du Bois. It was pointed out that these differences could be practically abolished by a slight reduction in the Sage standards.

4. It is suggested that although the deviation by the three methods are very similar, nevertheless it is desirable to have uniformity, and that, therefore, the Du Bois method be continued, since it already is in common use and since the others appear to possess no material advantage over it. (J. J. O'M.)

EYE, EAR, NOSE, AND THROAT.

COLLEDGE, L. *Injuries to the ear in modern warfare.* Jour. Laryngol., Rhinol., and Otol., June, 1921.

The author's observations were made from an aural center in an army area. Trench warfare made such a fixed center possible, thus securing early treatment for acute cases, retaining many in the area who would otherwise have been lost by evacuation to a base, enabling slight complaints to be dealt with, and the classification of men as fit for duty, special duty at listening posts, or unfit for front-line work.

Deafness from gunfire was very common among gunners, who constituted a great proportion of the patients. The lesions permitted dividing cases into two classes. First, those with progressive deafness from prolonged exposure to the noise of gunfire, without any visible change but with definite loss of bone conduction. Improvement was slow, partial, and a prolonged rest was really required. Second, those in whom deafness resulted from a single blast without any visible change. These cases recovered more rapidly as a rule, though tinnitus often persisted. In some of the latter cases the drumhead was seen to be spotted with minute punctate hemorrhages.

Primary rupture of the tympanic membrane is much less common and is a more severe injury than is generally supposed. The membrana tensa is more commonly involved. Most ears heal if left alone, but many suppurate, especially if the ear is syringed. If the perforation heals, the hearing is remarkably good, and in some cases perfect hearing resulted even following severe suppuration. This has been explained by Bourgeois as follows: If the tympanic membrane is not torn the impact transmitted along the ossicles to the oval window alone sets up a marked displacement of the labyrinthine fluid with labyrinth disturbances, while if the membrane is torn there is no ossicular transmission and the force falls equally on both oval and round windows, and consequently no disturbance of the labyrinth nor displacement of the fluid results.

Actual malingering is quite uncommon, although exaggeration of deafness is seen. A man with a normal drumhead may have otosclerosis or internal ear deafness, but complete absence of bone conduction is most suspicious, and if combined with a furtive expression and a shifty demeanor is highly characteristic. (L. H. C.)

FAULDER, T. J. *Injuries to the ear in modern warfare.* Jour. Laryngol., Rhinol. and Otol., June, 1921.

An accurate determination of the effects of modern warfare upon the hearing and the ears is rendered difficult because of the frequent lack of careful records of the aural condition of men on enlistment.

The author, in nearly 20 years' service with artillery, including three years of the Great War, saw but one case of rupture of the drumhead as a result of gunfire. Hemorrhage from the ears, usually slight, was not uncommonly seen, and it was noted that granulations and exposed mucous membrane could be made to bleed as a result of excessive stimulation. He emphatically states that the presence of blood in the meatus is not sufficient evidence to diagnose rupture of the drumhead.

Large numbers of men got impaired hearing, the degrees of which were varied, but were for the most part not severe. Reduction of both bone and air conduction was found in most cases. It was noted that men with damaged ears suffered less, proportionately, than those with sound ears.

In cases of excessive stimulation of the eighth nerve some cases seem to recover while a great many cases have only the subjective symptoms of tinnitus persisting. Protective appliances interfering with hearing are usually disliked by the men. The author found plugs of wool moistened with paraffin or glycerin useful under certain circumstances. A fairly common phenomenon, hyperaesthesia acustica, was noted when after a period of time the various sounds and noises became painful. It bore no apparent relationship to the production of deafness and, being a very definite thing, had to be differentiated from the psychological nervousness. Men on leave found certain sounds and noises extremely painful. (L. H. C.)

JACKSON, C. *The symptomatology and diagnosis of foreign bodies in the air and food passages.* Based upon a study of 789 cases. Am Jour. Med. Sc., May, 1921.

The author, after an exhaustive discussion of the subject, gives the following summary of the chief points in the symptomatology and diagnosis of a foreign body in the air and food passages.

LARYNX.

1. Foreign bodies lodged in the larynx cause an initial laryngeal spasm which is followed by more or less laryngeal wheezing, croupy cough, and a variable degree of impairment of phonation.
2. Pain in the laryngeal region may be present and is sometimes referred to the ears.

3. The larynx may tolerate a thin, flat foreign body for a relatively long period of time, but the development of increasing dyspnea renders early removal imperative in the majority of cases.

TRACHEA.

4. Tracheal foreign bodies are usually movable and their movements can usually be felt by the patient.

5. The vibrations may be palpated and heard with the stethoscope.

6. Cough is usually present at once, may disappear for a time and recur, or may be continuous and may be so violent as to induce vomiting.

7. Sudden shutting off of the expiratory blast and phonation during paroxysmal cough is almost pathognomonic of a movable tracheal foreign body.

8. Dyspnea is usually present and is due to the bulk of the foreign body plus the subglottic swelling caused by the traumatism of the shiftings of the intruder.

9. The asthmatoïd wheeze is usually present and is often louder and of lower pitch than the asthmatoïd wheeze of bronchial foreign bodies. It is heard at the mouth, not at the chest wall.

10. Pain is not a common symptom, but may occur and be accurately localized by the patient.

EARLY SYMPTOMS OF IRRITATING FOREIGN BODY (SUCH AS A PEANUT KERNEL) IN THE BRONCHUS.

BRONCHI.

11. Initial laryngeal spasm is almost invariably present with foreign bodies of organic nature, such as nut kernels, peas, beans, maize, etc.

12. A diffuse purulent laryngo-tracheo-bronchitis develops within 24 hours in children under 2 years.

13. Fever, toxemia, cyanosis, dyspnea, and paroxysmal cough are promptly shown.

14. The child is unable to cough up the thick mucilaginous pus through the swollen larynx and may "drown in its own secretions" unless the offender be removed.

15. Lung abscess rapidly forms.

16. The older the child the less severe the reaction.

17. In the early stages an acute obstructive emphysema is present, manifested by: (a) Limited expansion, (b) muffled tympanitic percussion note, (c) marked diminished or absent breath sound on the obstructed side, (d) many râles and harsh breathing on the free side.

18. The radiograph confirms these signs by showing (*a*) greater transparency on the obstructed side, (*b*) displacement of the heart toward the free side, (*c*) depression and limitation of the diaphragmatic movement on the obstructed side.

SYMPTOMS OF PROLONGED FOREIGN BODY SOJOURN.

BRONCHI.

19. The time of inhalation of a foreign body may be unknown or forgotten.

20. Cough and purulent expectoration ultimately result, although there may be a protracted delusive symptomless interval.

21. Periodic attacks of fever, with chills and sweats, and followed by increased coughing and the expulsion of a large amount of purulent, usually more or less foul, material are so nearly diagnostic of foreign body as to call for exclusion of this probability with the utmost care.

22. Emaciation, clubbing of the fingers and toes, night sweats, hemoptysis, in fact all of the symptoms of tuberculosis are in most cases simulated with exactitude, even to the gain in weight by an outdoor regimen.

23. Tubercle bacilli have never been found in the bronchoscopic clinic associated with foreign body in the bronchus. It was the only element lacking in a complete clinical picture of advanced tuberculosis. A point of difference was the rapid recovery after removal of the foreign body.

24. The erroneous statement in all of the textbooks that foreign body is followed by phthisis pulmonalis is an heirloom of the days when the bacillary origin of true tuberculosis was unknown, hence the foreign body phthisis pulmonalis or pseudotuberculosis was confused with the true pulmonary tuberculosis of bacillary origin.

25. The subjective sensation of pain may allow the patient to localize a foreign body accurately.

26. Foreign bodies of metallic or organic nature may cause their peculiar taste in the sputum.

27. Offensive odored sputum should always suggest bronchial foreign body; but absence of sputum, odorous or not, should not exclude foreign body.

28. Sudden complete obstruction of one main bronchus does not cause noticeable dyspnea provided its fellow is functioning.

29. Complete obstruction of a bronchus is followed by rapid onset of symptoms.

30. The pleura is rarely involved. Rib resection done for supposed empyema have with one exception shown no pus.

31. The physical signs usually show limitation of expansion on the affected side, impairment of percussion, and lessened transmission or absence of breath sounds distal to the foreign body.

32. The "asthmatoïd wheeze" may, if present, be of great diagnostic value. Its absence, however, does not negative the presence of foreign body.

33. All cases of chest disease should have the benefit of a radiographic study to exclude bronchial foreign body as an etiological factor, and negative opinions should never be based upon any plates except those of the utmost perfection that the wonderful modern development of the art and science of roentgenology can produce. In doubtful cases, the negative opinion should not be conclusive until a roentgenologist of long and special experience in chest work has been called in consultation. Even then there will be an occasional case calling for diagnostic bronchoscopy.

34. Symptoms of pulmonary abscess, or other lung disease, even cough, following within a few weeks of the extraction of teeth, call for the exclusion of foreign body in the lung.

ESOPHAGUS.

35. There are no absolutely diagnostic symptoms of esophageal foreign body.

36. Dysphagia, however, is the most constant complaint, varying in degree with the size of the foreign body and the degree of inflammatory or spasmodic reaction produced.

37. Pain may be caused by the penetration of a sharp foreign body, by inflammation secondary thereto, by impaction of a large object, or by spasmodic closure of the hiatal sphincter.

38. The subjective sensation of foreign body is usually present, but can not be relied upon as assuring the presence of a foreign body, for it is present for a time after the passage of the intruder.

39. All of these symptoms may exist, often in most intense degree, from previous violent attempts at removal, and the foreign body may or may not be present.

40. Fluoroscopic study of the swallowing function with barium mixture or capsule will give the location of a foreign body which may not be radiopaque.

41. Anteroposterior and lateral roentgenograms should always be made.

42. The value of a radiograph after the removal of the foreign body can not be too strongly emphasized.

STOMACH.

Foreign body in the stomach ordinarily produces no symptoms. The roentgenogram and the fluoroscopic study with an opaque mixture are the chief means of diagnosis. (W. M. K.)

WÜRDEMANN, H. V. **Etiology and prevention of injuries to the eye.** *Mil. Surgeon*, August, 1921.

The author, in a general discussion of the etiology of eye injuries, gives the following outline of the objective examination of an eye.

"Inspection by direct illumination by daylight, electric light, or reflecting mirror is first made. The skin, lids, cornea, conjunctiva, puncta, lacrimalia, etc., are observed. Then the retrobulbar folds and undersurface of the lids are brought into view by eversion with the fingers, but preferably by pushing down the retrotarsal folds by a smooth instrument, as a small glass rod, handle of an instrument, or cotton-tipped stick, as it is here that most diseases of the conjunctiva are prominent and foreign bodies may be impacted therein.

"Many small and otherwise almost indistinguishable abrasions of the corneal epithelium, wounds, and small foreign bodies in the cornea may be brought into view by the staining of the tissues with a 2 per cent fluorescein and 2 per cent bicarbonate of soda solution. This aniline dye will not stain the intact corneal epithelium, but readily passes into the subjacent parenchyma and abraded epithelial cells, forming a bright-green background upon which foreign bodies are readily perceived.

"Magnification of the eye by a lens, preferably by the Berger or Jackson binocular loupe, is of great value.

"Focal illumination in the dark room is ordinarily carried out by focusing the light upon the eye by a large loupe. The use of the diaphanoscope for this purpose gives, however, a much better illumination, as the light is confined to a narrow beam.

"The ophthalmoscope should first be used at a distance of a couple of feet from the eye and magnification obtained by use of a +3 to +16 lens in the instrument, the patient being directed to look in various directions, whereby a foreign body may be brought into view against the red background of the fundus; approaching closer to the eyes, after the cornea and anterior chamber have been examined in this manner, the lens, vitreous, and fundus are then successively investigated. The electric ophthalmoscope, with light regulated by a rheostat, gives the most elastic means of such examination. Diaphanoscopy is a means of rendering the eyeball luminous, whereby the shadow of the ciliary body, iris, tumor, or large foreign body within the eye may be observed. I have a number of times determined the presence of foreign bodies which were at first indiscernible by other methods behind the iris, in the lens, or in the fundus, by this method.

"The sideroscope, if properly made and mounted, will determine the presence of a foreign body, but it must be magnetic, and the accuracy with which you are able to locate foreign bodies within the eye often varies from 1 to 3 cm. 'The instrument is a marvel of delicacy, but to handle it requires the patience of a saint.'

"The giant magnet will reveal the presence of magnetizable pieces of steel and iron by causing traction within the eye, varying from a drawing sensation to decided pain on approach of the eye to the magnet. The foreign body may likewise be drawn into view, or the eye may adhere or curve forward toward the magnet if the body be sufficiently large. Such a method of examination is, however, somewhat dangerous on account of the foreign body, while approaching the magnet, acting as a missile and tearing structures that might not have been previously injured. In such examination the eye, needless to say, should not be anesthetized.

"The increasing use of magnesium and nickel steel renders the number of nonmagnetizable foreign bodies somewhat larger in proportion than previously.

"The exact determination of the existence, position, and size of foreign bodies within the globe has only become possible since the advent of the roentgen rays.

"As the frequency of injuries to the eye from flying copper increases in number each year, due to more extended use of that metal, largely from the increased use of electricity, the value of *accurate radiographs* becomes more apparent.

"In a series of experiments to determine the degree of penetration of the X rays to various substances, such as glass, marble, granite, cement, etc., the size of each was approximately $2 \times 2\frac{1}{2}$ mm.; the result shows that all of these substances can be made visible if proper technique be followed. The figures show the density of shadows of each material, the exposure being the same for all materials, coal being the only one used that failed to demonstrate a shadow of any usefulness." (W. M. K.)

MOSHER, H. P. The Mosher-Toti operation on the lachrymal sac. *Laryngoscope*, May, 1921.

The author in a brief summary gives the steps of the combined external and internal operation on the lachrymal sac and nasal duct, as modified by him from the operation devised by Toti.

The results thus far obtained have been most satisfactory. In a series of 21 cases operated or supervised by the author 1 case was done one year ago and has been perfectly well since. The remaining 20 were operated during the past six months and, in the majority, the results so far have been good in that the infection has been cleared up and the patient has been relieved of the epiphora.

The operation is comparatively simple to perform and has the great advantage of being done entirely by sight. No case of orbital infection has occurred to date. Time necessarily will determine the permanency of the excellent results thus far obtained. (L. H. C.)

LEEGAARD, F. **Tuberculosis of the middle ear.** *Laryngoscope*, June, 1921.

The author's observations were made in the University Hospital in Christiania, Norway, among patients suffering from purulent otitis media to determine the relative frequency of tuberculosis of the middle ear. In his studies 200 cases of purulent otitis media are included, and all cases but one had a mastoid operation performed. The laboratory studies included histological examination of tissue removed at the time of operation and guinea-pig inoculation using material untreated with antiformin, which was injected subcutaneously. These two methods are considered the most trustworthy.

Among the 200 cases of acute, subacute, and chronic purulent otitis media 20 cases of tuberculosis of the middle ear were found. Of these, 13 occurred among 95 males and 7 among 105 females. Among 115 acute and 78 chronic cases of middle-ear disease 10 and 5 cases, respectively, were found tuberculous, while in the 7 subacute cases 5 were tuberculous. Regarding age, the incidence was found greatest between the ages of 3 and 7 years—9 cases in 30 examined. He is unable to explain this high rate, but points out that tuberculosis in children is common as evidenced by the high percentage of positive tuberculin tests obtained among school children.

In the clinical diagnosis no constant characteristic findings were noted. More than one perforation of the drum membrane is considered significant of tuberculous otitis media, but he found this in only one case, and this a phthisical subject. Tubercles on the drum membrane, although typical, are rare. In acute and subacute cases the presence of abundant, rapidly growing, and recurring granulations is of importance. Facial paralysis is considered of frequent occurrence, but the author found none in the cases of tuberculosis, while he found 4 cases among the 180 nontuberculous patients; however, facial palsy and multiple perforations of the drum are commonly seen in advanced pulmonary or other form of tuberculosis complicated by middle-ear disease.

Regarding the findings at operation—the appearance of the granulations is not considered characteristic but the presence of yellow-white or gray-white, puttylike material is positive evidence of the presence of tuberculosis. No cholesteatoma was found and the amount of pus in the mastoid was usually small.

Pain is a fairly constant symptom and about half of the cases started as acute otitis media, so the clinical picture affords little toward making a diagnosis of tuberculosis. The postoperative course is more typical, for in cases where either the simple or radical operation had been done the wound did not heal rapidly, a long, narrow, encrusted sinus often persisting; and while some cases healed in from 6 to 12 months, others did not heal at all. This is seen especially in children.

The Von Pirquet test was done in 191 cases and gave 67 negatives and 124 positives. A negative reaction is of value at all ages while a positive is of value clinically only in cases of otitis media occurring in children under 7 years of age. Regarding treatment, operation should be resorted to unless there is some distinct contraindication. The author used tuberculin in those cases where improvement, postoperative, was not satisfactory. Application was made directly into the diseased middle ear to avoid some of the untoward effects, e. g. facial paralysis and labyrinthine disturbances, recorded in the literature. From the 20 cases a like number of strains of tubercle bacilli were cultivated, and further inoculation tests showed them all to be of the human type.

No definite conclusions were drawn from these cases; however, the comparative frequency of tuberculous otitis media, especially between the third and seventh years of age, the lack of characteristic clinical signs and symptoms, also operative findings, and the question of tuberculin treatment require the studying of a greater amount of material and the careful examination of all cases of otitis media, especially when occurring in children. (L. H. C.)

NOTES AND COMMENTS.

From the British Journal of Surgery for July, 1921, we learn that Sir D'Arcy Power, K. B. E., of London, proposes to give in a series of articles to appear in that publication the ipsissima verba of those surgeons whose names are associated with the diseases or injuries to which they first called attention. Many of these descriptions, he tells us, are so short that they can be reproduced at length; others will be abbreviated but all are so clear that they have gained a world-wide acceptance. If one has access to a large medical library the original papers are not hard to find, but few medical officers have the leisure or the opportunity to discover them; therefore, Sir D'Arcy's series of short articles should prove, as he says, both instructive and interesting.

His first presentation is the original paper which gave the name to Colles's fracture. It appeared in the Edinburgh Medical and Surgical Journal, 1814, Volume X, page 182, and was entitled "On the fracture of the carpal extremity of the radius, by A. Colles, M. D., one of the professors of anatomy and surgery in the Royal College of Surgeons in Ireland." The following is a complete transcript of this historic paper:

"The injury to which I wish to direct the attention of surgeons, has not, as far as I know, been described by any author; indeed, the form of the carpal extremity of the radius would rather incline us to question its being liable to fracture. The absence of crepitus and of the other common symptoms of fracture, together with the swelling which instantly arises in this, as in other injuries of the wrist, render the difficulty of ascertaining the real nature of the case very considerable.

"This fracture takes place at about an inch and a half above the carpal extremity of the radius, and exhibits the following appearances:

"The posterior surface of the limb presents a considerable deformity, for a depression is seen in the forearm about an inch and a half above the end of this bone, while a considerable swelling occupies the wrist and metacarpus. Indeed, the carpus and base of metacarpus appear to be thrown backward so much as on first view to

excite a suspicion that the carpus has been dislocated forward. On viewing the anterior surface of the limb, we observe a considerable fulness, as if caused by the flexor tendons being thrown forward. This fulness extends upward to about one-third of the length of the forearm and terminates below at the upper edge of the annular ligament of the wrist. The extremity of the ulna is seen projecting toward the palm and inner edge of the limb; the degree, however, in which this projection takes place is different in different instances.

"If the surgeon proceed to investigate the nature of this injury, he will find that the end of the ulna admits of being readily moved backward and forward.

"On the posterior surface he will discover by the touch that the swelling on the wrist and metacarpus is not caused entirely by an effusion among the softer parts; he will perceive that the ends of the metacarpal and second row of carpal bones form no small part of it. This, strengthening the suspicion which the first view of the case had excited, leads him to examine in a more particular manner the anterior part of the joint, but the want of that solid resistance, which a dislocation of the carpus forward must occasion [*sic*], forces him to abandon this notion, and leaves him in a state of perplexing uncertainty as to the real nature of the injury. He will therefore endeavor to gain some information by examining the bones of the forearm. The facility with which (as was before noticed) the ulna can be moved backward and forward does not furnish him with any useful hint. When he moves his fingers along the anterior surface of the radius, he finds it more full and prominent than is natural; a similar examination of the posterior surface of this bone, induces him to think that a depression is felt about an inch and a half above its carpal extremity. He now expects to find satisfactory proofs of a fracture of the radius at this spot. For this purpose, he attempts to move the broken pieces of bone in opposite directions; but, although the patient is by this examination subjected to considerable pain, yet neither crepitus nor a yielding of the bone at the seat of fracture nor any other positive evidence of the existence of such an injury is thereby obtained. The patient complains of severe pain as often as an attempt is made to give the limb the motions of pronation and supination.

"If the surgeon lock his hand in that of the patient's, and make extension, even with a moderate force, he restores the limb to its natural form, but the distortion of the limb instantly returns on the extension being removed. Should the facility with which a moderate extension restores the limb to its form induce the practitioner to treat this as a case of sprain, he will find, after a lapse of time sufficient for the removal of similar swellings, the deformity undimin-

ished. Or, should he mistake the case for a dislocation of the wrist, and attempt to retain the parts in situ by tight bandages and splints, the pain caused by the pressure on the back of the wrist will force him to unbind them in a few hours; and if they be applied more loosely, he will find at the expiration of a few weeks that the deformity still exists in its fullest extent and that it is now no longer to be removed by making extension of the limb. By such mistakes the patient is doomed to endure for many months considerable lameness and stiffness of the limb, accompanied by severe pains on attempting to bend the hand and fingers. One consolation only remains, that the limb will at some remote period again enjoy perfect freedom in all its motions and be completely exempt from pain; the deformity, however, will remain undiminished through life.

"The unfavorable result of some of the first cases of this description which came under my care forced me to investigate with peculiar anxiety the nature of the injury. But while the absence of crepitus and of the other usual symptoms of fracture rendered the diagnosis extremely difficult, a recollection of the superior strength and thickness of this part of the radius, joined to the mobility of its articulation with the carpus and ulna, rather inclined me to question the possibility of a fracture taking place at this part of the bone. At last, after many unsuccessful trials, I hit upon the following simple method of examination by which I was enabled to ascertain that the symptoms above enumerated actually arose from a fracture seated about an inch and a half above the carpal extremity of the radius.

"Let the surgeon apply the fingers of one hand to the seat of the suspected fracture and, locking the other hand in that of the patient, make a moderate extension, until he observes the limb restored to its natural form. As soon as this is effected let him move the patient's hand backward and forward, and he will, at every such attempt, be sensible of a yielding of the fractured ends of the bone and this to such a degree as must remove all doubt from his mind.

"The nature of this injury once ascertained, it will be a very easy matter to explain the different phenomena attendant on it, and to point out a method of treatment which will prove completely successful. The hard swelling which appears on the back of the hand, is caused by the carpal surface of the radius being directed slightly backward instead of looking directly downwards. The carpus and metacarpus, retaining their connections with this bone, must follow it in its derangements and cause the convexity above alluded to. This change of direction in the articulating surface of the radius is caused by the tendons of the extensor muscles of the thumb, which pass along the posterior surface of the radius in sheaths firmly connected with the inferior extremity of this bone. The broken ex-

tremity of the radius being thus drawn backward, causes the ulna to appear prominent toward the palmar surface, while it is possibly thrown more toward the inner or ulnar side of the limb, by the upper end of the fragment of the radius pressing against it in that direction. The separation of these two bones from each other is facilitated by a previous rupture of their capsular ligament, an event which may readily be occasioned by the violence of the injury. An effusion into the sheaths of the flexor tendons will account for that swelling which occupies the limb anteriorly.

"It is obvious that, in the treatment of this fracture, our attention should be principally directed to guard against the carpal end of the radius being drawn backward. For this purpose, while assistants hold the limb in a middle state between pronation and supination, let a thick and firm compress be applied transversely on the anterior surface of the limb at the seat of fracture, taking care that it shall not press on the ulna; let this be bound on firmly with a roller and then let a tin splint, formed to the shape of the arm, be applied to both its anterior and posterior surfaces. In cases where the end of the ulna has appeared much displaced I have laid a very narrow wooden splint along the naked side of this bone. This latter splint I now think should be used in every instance, as, by pressing the extremity of the ulna against the side of the radius, it will tend to oppose the displacement of the fractured end of this bone. It is scarcely necessary to observe that the two principal splints should be much more narrow at the wrist than those in general use and should also extend to the roots of the fingers, spreading out so as to give a firm support to the hand. The cases treated on this plan have all recovered without the smallest defect or deformity of the limb in the ordinary time for the cure of fractures.

"I can not conclude these observations without remarking that were my opinion to be drawn from these cases only which have occurred to me I should consider this as by far the most common injury to which the wrist or carpal extremities of the radius and ulna are exposed. During the last three years I have not met with a single instance of Dessault's dislocation of the inferior end of the radius, while I have had opportunities of seeing a vast number of the fracture of the lower end of this bone.

"STEPHENS GREEN, *February 21, 1814.*"

The Presse Médicale, Paris, for June 29, 1921, contains an appreciative editorial report by Prof. E. Benoit, of Montreal, on the Fifth Congress of American Medicine, held in Baltimore, February 21 to 26, 1921. It is always interesting, when possible, to see ourselves as others see us. Prof. Benoit, after adverting to the fact

that American medicine is now advancing by rapid strides and gives promise of reaching the high plane already attained by American surgery, compares the methods in vogue at an American congress of medicine with the conduct of a similar meeting abroad. He holds that most of the papers read and discussions carried on at medical meetings in Europe would be fully as useful if they simply appeared from the first in current medical periodicals, and thinks that the distinctly clinical character of American meetings has far greater practical value. He notes as peculiar to America the disposition to exploit the clinical facilities and clinical methods in vogue in the city where the congress meets.

Dr. Benoit was especially impressed with the large number of visitors who could be accommodated at medical clinics on the occasion of a congress; the fact that such a congress is more than a holiday or an opportunity for formal meetings and calls. Of special importance for those attending a medical congress is the opportunity to compare the different methods that obtain in the various hospitals, dispensaries, and clinics of a large medical center.

Our system of medical instruction, our haphazard granting of diplomas, and many other features of American professional training and life have so long been the object of frank, not to say harsh, criticism at the hands of our foreign colleagues, that it is most gratifying to read discriminating but favorable comment on some features of American medical work.

A valuable publication for medical officers on distant stations is the series of "Case Records" (*ante mortem* and *post mortem*) as used in weekly clinico-pathological exercises at the Massachusetts General Hospital, edited for the use of practitioners by Richard C. Cabot, M. D., and Hugh Cabot, M. D. Published weekly by the Massachusetts General Hospital, Boston, Mass., the "Case Records" reproduce in print the class exercises held at the hospital. The clinical history of each case is printed on one sheet to be studied first. On another is printed the class discussion. The clinical diagnosis in the wards and in the class are then given, and finally the pathological findings. The subscription price of the series is \$8 yearly.

The American Society for the Control of Cancer, whose headquarters are at 25 West Forty-fifth Street, New York City, has announced plans for a national cancer week to be conducted from October 30 to November 5. The society aims to give the widest publicity throughout the country to the question of cancer during that week;

and in order to aid physicians who might desire to give lectures on this subject the society has prepared a lecture syllabus which may be had on application to the society's headquarters in New York. The lecture outline comprises a fairly comprehensive discussion of the whole subject of cancer.

An announcement has been made of the authorization by the board of trustees of the United States Pharmacopœial Convention of the use of the text of the ninth revision of the United States Pharmacopœia for translation into the Chinese language. It is understood that this will be accepted by the Government officials in China and become the Pharmacopœia of China, first edition.

George Vitoux, writing in the *Presse Médicale* for June 25, 1921, reports a discussion on the municipal disposal of garbage before the Society of Public Medicine. M. Mazerolle summarizes as follows the principal problems connected with the municipal disposal of garbage: (1) Destruction of domestic garbage within domiciliary limits; (2) systematic sorting of garbage; (3) appropriate covered receptacles; (4) the type of wagons for removal; (5) schedule for collection; (6) the financial aspects of garbage disposal.

Immediate local destruction of garbage within domiciliary limits would be the ideal method of disposal if a practical working system could be devised. This has not been done.

At Charlottenburg, near Berlin, the systematic sorting of garbage is carried out. Three different recipients are used: One for kitchen refuse, a second for nonfermentable material, such as rags, paper, broken crockery, and the like; and a third for ashes, cinders, etc.

The greatest difficulty in the handling of garbage is to devise a container with a lid that can be safely fastened without too much difficulty. M. Mazerolle showed a model of the garbage container which he recommended, but unfortunately the article from which we quote is not illustrated.

In wholesale disposal of garbage by horse-drawn vehicles or automobile vans, two features are essential: (1) Such vehicles must be so covered that their contents will not be visible or liable to be blown away by the wind; (2) the loading and unloading must be easy of accomplishment.

The nocturnal collection of garbage is the ideal one, because the streets are then less congested and stores, etc., are closed. These two features lessen the danger of dissemination of garbage.

The task of removing and disposing of garbage should be financed in the same way that municipalities finance the supply of potable

water, of gas, of electricity, etc. In other words, garbage disposal should be viewed in the light of a public utility. The duty of disposing of garbage is absolutely analogous to the duty of providing a sewerage system.

The first number of *The American Journal of Tropical Medicine* appeared in January of this year. This journal is the official organ of the American Society of Tropical Medicine and will be published bimonthly by Williams & Wilkins Co., of Baltimore. Its editor in chief is Lieutenant Colonel H. J. Nichols, Medical Corps, U. S. Army, and the advisory editorial board is a most excellent one. Its articles should be of particular interest to naval medical officers.

On small vessels serving along the coasts of Central America it is not uncommon for parties of men to camp on the beach over a week end for the purpose of hunting, fishing, or other recreation. Delectable as this practice is, it is not unattended by danger.

Recently five young employees of the Balboa shops went on an excursion into the unsanitated area of the interior of the Canal Zone and spent a night in a vacant shack. Following their return four of them were admitted to Ancon Hospital, where they were found to be suffering from relapsing fever. A few days later four young boys of Pedro Miguel also slept in the same shack. Two of them were subsequently sent to Ancon Hospital with relapsing fever and one of these had malaria also.

The entomologist of the board of health laboratory was sent to the locality to make an investigation. He found in the shack where these boys had slept a rude bed made of dried bamboo. The bed was fairly alive with ticks—hundreds of them. Quite a number were collected and brought back to the laboratory for identification and experimental work to determine if they are of the type that really convey the disease. The laboratory work has not yet been completed, but the evidence above presented is sufficient to demonstrate that such trips to the uncontrolled or unsanitated areas of the Isthmus are fraught with dangers, and that even those who take precautions against mosquito bites may be exposed to attack by other insects equally dangerous.

We learn from the *British Medical Journal* for May 14, 1921, that "at a meeting of the war section of the Royal Society of Medicine, Surgeon Commander S. F. Dudley, R. N., related a few observations on the influenza epidemic as it affected the Royal Navy. He referred

principally to the epidemic of 1918, though he also touched on the epidemic as seen at Portsmouth at the beginning of 1921. He began with some remarks on bacteriology. He said that he had been able to demonstrate *B. influenzae* in association with the cases, save in the spring cases of 1918, when he used an unsatisfactory technique. He thought that this organism was the most likely cause of the epidemic, but it was curious that within the last two years he had swabbed batches of men—260 in all—who exhibited no signs of influenza, but were mostly venereal convalescents at Haslar, and in half of them he found this organism in the nose and throat. The probability was that the organism which went by this name was really a group of organisms, and the variation in the morphology of the different strains supported this view. The reason for these numerous influenza carriers might be that only certain strains of *B. influenzae* were capable of producing influenza symptoms. He thought it possible that if the whole population of the country had been continuously examined during the last two years it would be found that almost all persons at some time or other for a longer or shorter period harbored influenzalike organisms. Virulent carriers, however, did exist, as well as harmless carriers, and it seemed reasonable to suppose that it was the infective individual who adapted himself to the parasite rather than the parasite which adapted itself to its host. His theory to explain the number of harmless carriers was that the virulent strains which started an epidemic became eliminated, and the organism succeeded in adapting itself to its environment and became the highly infective but innocuous strain found in these so-called carriers. The great variation in influenza attack was due (1) to variation in the primary organism, (2) to variations in individual susceptibility, (3) to different combinations of bacterial flora causing the illness. Whatever the primary parasite might be, it depressed the resistance to bacterial invasion, so that any pathogenic organism in the neighborhood seemed to attain greater virulence, the result being a complex disease in which the secondary invader might play the more important part. The fact that the pulmonary complications of influenza were generally present from the onset suggested that the so-called secondary infection was not secondary in time, but was contracted simultaneously with the primary infection. Possibly influenza was always a double infection with *B. influenzae* plus another organism, whose assistance made the influenza bacillus a more dangerous parasite.

“Surgeon Commander Dudley then related the history of a few ships of the Royal Navy during the epidemic of 1918. As an instance of high infectivity and high virulence he gave the case of H. M. S. *Africa*, where, among a ship’s company of nearly 800, the attack rate was 75 per cent and the case mortality 9 per cent, and H. M.

S. *Britania*, where the attack rate was 58 per cent and the case mortality 7.5 per cent. On H. M. S. *Revenge*, with a company of 1,200, the attack rate in the first wave (spring, 1918) was 17 per cent and in the second wave (autumn, 1918) it was 20 per cent. He believed that the attack rate to be expected in a thoroughly infected ship was 25 per cent in the first wave and 25 per cent in the return wave. A ship's company—and possibly this was true of the population as a whole—consisted roughly of a quarter who were highly susceptible, succumbing at once; a quarter who were less susceptible, succumbing on the return wave, while the other half had natural immunity. In the early part of 1921, at Portsmouth, one ship reported 82 cases, or 7 per cent of her company, and another 61 cases, or 6 per cent. Many of these cases were little more than feverish colds. It might be that the strain of influenza of 1921 was totally different from that of 1918, but he inclined to the view that by 1921 about 5 per cent of the population had become highly susceptible, 5 per cent ordinarily susceptible, and 90 per cent fairly immune to the influenza virus, as against 50 per cent susceptible and 50 per cent immune in the 1918 epidemic. He believed that disinfection sprays and gargles and isolation were of little effect in the crowded condition of a battleship, where 1,000 men might be living within an area, including all decks, of a quarter of a square mile, but that disease could be kept from spreading from ship to ship and from shore to ship if the quarantine was made absolute. Prophylactic vaccination probably diminished the incidence to one-third and the case mortality to nearly one-twentieth."

Benvenuto Cellini (1500–1571), a highly artistic Italian goldsmith and metal worker, wrote an autobiography which has long had a fascination for those who delight to delve into the past. There are many translations of Benvenuto's book, the best being that of John Addington Symonds, published by Brentano and by Scribners. Royal Cortissoz, in a delightful essay on this remarkable man, tells us that the pages of Cellini's autobiography are invaluable for the pictures they contain of Italian society in the author's day. "He touched life at many points, mingling not only with artists but with princes and prelates. He had a 'devouring eye' and a good memory. A thing once seen stuck in his mind; a thing once heard by him was well remembered and when he dictated his memoirs he gave them the vitality of a daily journal. Moreover, he was of the race of Boccaccio, which is to say, that he was a born story-teller, a man who naturally dramatized his experiences as he came to relate them, making the most of a personality or a situation, and above all flinging over everything an air of reality, of movement.

"Cellini was a master of picaresque literature. He loved adventure and nothing in the world gave him quite the joy that he got from a hand-to-hand fight. He was happy when he was at work; happy when he was foregathering with Giulio Romano or some other boon companion in Florentine Bohemia when the day's task was done; happy when he was arguing with a patron; happy when he was driving his dagger up to the hilt in the neck of his enemy; happy in short, whenever circumstances convinced him that he was alive and playing the part of a man.

"Cellini may have been too late to witness the richest developments of the Renaissance, but there were still great spirits on earth sojourning when he was born, and even those public figures that were not precisely great had characteristics or filled positions significant to the modern reader. Cellini filled his canvas with a generous hand. He was himself his best theme, but he drew a friend or an enemy with the same care that he bestowed upon his own traits or mischances, and though he had a due sense of the powers of the great ones with whom he came in contact, it was with a quite unhampered brush that he introduced pope or mundane potentate upon the scene. He spoke of artists and their work with the intimate accent of Vasari and with a robuster, warmer, more roughly human element of appreciation in his voice. He was every inch a man, and it was a man's report of what he did and felt and saw that he gave us."

Cellini lived in Italy during a period when medical practice was still hand in hand with quackery and superstition. His impressions and experiences of medicine and doctors have been set forth recently by Dr. Jacob Rosenbloom in an essay published in the fourth number of the second volume of Paul B. Hoeber's *Annals of Medical History*. Dr. Rosenbloom believed Cellini to have been a paranoiac, and all medical men who have read Cellini's book may readily agree with him. He had plague at an early age and malaria several times. He described an illness lasting two months which he ascribed to the bad air of Pisa. This may have been typhoid. He cited a case of what might have been osteomyelitis, in the treatment of which Maestro Giacomo Rostelli, a surgeon of note, "was using some coarse steel instrument" which was inflicting severe pain on the patient. Cellini begged the surgeon to stop, and running to his shop he made "a little scalping iron of steel, extremely thin and curved; it cut like a razor." The surgeon used it with so gentle a hand that the patient felt no pain. Cellini was the victim of gout in his later years, and had two surgical accidents, a fracture of the leg and a splinter of steel in the eye, besides numerous wounds acquired in brawls.

As he lived in lawless and profligate times he contracted syphilis, or the French disease, as it was then called in Italy, which remained dormant for four months and then "broke out over his whole body."

After quarreling with his doctors over the diagnosis and treatment of his disease, he began to take guaiacum, recently introduced from America, "against the advice of the first physicians in Rome," and after 50 days he was cured and "as sound as a fish in the water."

He had several recurrent manifestations of the disease. A slow fever which he attributed to the exposure of hunting on the campagna might have been of syphilitic origin. Once he had a painful inflammation of the eyes cured by a simple eye wash recommended by the Pope. Dr. Rosenbloom believes this affliction to have been of an hysterical nature, but it might have been an iritis due to syphilis.

Cellini mentions as one of his acquaintances, Giacomo da Carpi, a great physician, surgeon, and student of anatomy, who is said to have been the first to use mercury in the cure of syphilis. He amassed a large fortune through the results of the practice of mercurial fumigation and inunction.

Cellini tells us that at least three attempts were made to poison him; in one a crushed diamond was to be mixed with his food, with the object of producing an enteritis, but the poor workman entrusted with the breaking of the precious stone substituted a soft stone, so enriching himself, and, as Benvenuto Cellini believed, saving him from a painful death. Once some enemy put some mercury or arsenic into a sauce of which Cellini ate "two moderate mouthfuls." This produced a colitis from which he suffered greatly, but, as he tells us, "the poison worked so well that whereas, before I took it I had but perhaps three or four years to live, I verily now believe that it has helped me more than 20 years by bettering my constitution," for which we are thankful, for had the poison acted as designed we would have been deprived of his delightful autobiography.

Christophers, of London, has published *A Consulting Surgeon in the Near East*, by A. H. Tubley, F. R. C. S. (England), a consulting surgeon to the Mediterranean and Egyptian Expeditionary Forces in 1915-1919. The book gives a vivid picture of the conditions encountered by the British medical officers in the campaign in the eastern Mediterranean. The author tells of his experiences supervising the operative work when the sand-laden south wind was blowing and the temperature was 109° F., and when the wards were infested with flies which spread infection from the dysentery cases. He tells of transports for the sick, which seemed to lack everything necessary for the care of the sick, and he tells of the lice. The crisis of the Dardanelles campaign at Suvla is given graphically—the final defeat of the British forces, the overladen hospital ships, the insufficiency of fresh water, the absolutely necessary operations.

There are chapters dealing with his administrative experiences, surgical matters, the dental work, and the sick and convalescent soldier. The medical officer should find this a very readable book.

A special bulletin issued by the New York Department of Labor, on Asphyxiation in Garages, says that the formation of carbon monoxide gas is due to a lack of a proper amount of oxygen in the combustion process. One hundred and thirteen cases of asphyxiation occurred within two years in New York State. This emphasizes the necessity of proper and sufficient ventilation at all times about gasoline-driven motors.

After the armistice the nucleus of a permanent dental service in the British Navy was formed and new regulations governing entry into the Royal Naval Dental Service have recently been issued. Before a successful candidate is given a commission as surgeon lieutenant (D) in the British Navy he will be required to pass through a course of special training of a month's duration and his commission will be confirmed on passing the qualifying examinations at the end of this course. The subjects for the entrance examination will embrace dental surgery, including dental pathology and therapeutics, oral hygiene, and oral prosthetics. Candidates must obtain at least 50 per cent in each subject. A postgraduate course of three months' duration will be allowed to surgeon lieutenant commanders (D) of over two years' seniority. This postgraduate course is designed to afford senior officers the opportunity of refreshing their general knowledge of dental surgery and making themselves familiar with modern advances. The dental officer on a ship will be responsible directly to the captain. Surgeon lieutenants (D) will receive as pay from £401 to £492; surgeon lieutenant commanders (D), £493 to £730; and a surgeon commander (D), £775 to £912. There are to be 48 officers of the Royal Naval Dental Service, but of these only one can hold the rank of surgeon commander (D).

On February 24, 1921, there passed away at Boggs, Pencaitland, East Lothian, England, at the age of 56, Surgeon Captain Lomas R. N., an officer of note in the British service. Before the war he was operating surgeon at Haslar Hospital. In 1914 he had the unique experience of commanding two hospital ships, the *Maine* and the *Rohilla*, both of which were wrecked while transporting wounded. On these occasions his calm courage and unflinching example in the

face of appalling calamity and bitter exposure did much to maintain order, and to cheer and sustain the morale of patients who were apparently doomed. Captain Lomas was well known to several of our senior medical officers, who will learn of his death with the deepest regret. He was an honorary member of the Association of Military Surgeons of the United States.

Humphrey Mitford, of New York and London, has recently published the second edition of *Counsels and Ideals* from the Writings of William Osler, selected and edited by Dr. C. N. B. Camac, of New York. In 1905 Dr. Camac, who was a pupil of Osler, prepared, with the consent and guidance of his beloved teacher, a volume of *Counsels and Ideals*, selected from 47 of Sir William Osler's writings. The collection represented Dr. Osler's philosophy of life down to the time he was appointed regius professor of medicine at Oxford. The second edition contains extracts from 26 addresses and papers published since 1904, which form an appropriate summary of Dr. Osler's general teaching in England. This little volume should be in every physician's library.

One hundred years have passed since John Keats, the English poet, died in Rome. The first of his printed poems, "The Imitation of Spenser," was written in 1812, when he was but 17 years of age. The last appeared in 1820, when the poet lay dying from tuberculosis. Many of us have found pleasure in the beauty of his lines and in his philosophy, but few know that in his early youth Keats attempted the study of medicine. After his mother's death from tuberculosis Keats, then 15 years old, was apprenticed for five years to a surgeon named Hammond, at Edmonton, England; but in 1814, a year before his apprenticeship was completed, he entered at Guy's Hospital, and in 1816 passed the examination for the license of the Apothecaries' Society with credit. He never attempted any further medical work, and his writings do not reveal any obvious impression from his professional studies, yet it is difficult to conceive that his responsive mind was unaffected by them.

Mr. Paul B. Hoeber, of New York, has published the *Life and Times of Ambroise Paré*, by Dr. Francis R. Packard, of Philadelphia.

Ambroise Paré, the surgeon to Charles IX, began his surgical career as a rustic barber's apprentice. Later he became a dresser at the Hotel Dieu in Paris, from which, after eight years' practical

work, he entered the army and soon made himself the greatest surgeon of his time by his courage, ability, and common sense. Paré invented many new surgical instruments, made amputation what it is to-day by reintroducing the ligature, which had almost fallen into abeyance since the time of Celsus; was the first to popularize the use of the truss in hernia; introduced massage, artificial eyes of gold and silver, and made the first exarticulation of the elbow joint. The story of Paré's activities gives an interesting and vivid picture of Renaissance France. As a military surgeon Paré operated upon battlefields which coincide closely to those of the late war. Any medical officer who is interested in the history of medicine or in French history will find much of interest in this book.

The British Medical Journal for April 30, 1921, informs us that the fetor in ozena is due to the decomposition of protein bodies by means of bacterial tryptic ferments with formation of mercaptan and other sulphur compounds, and that the Perez bacillus, which is supposed to be the cause of ozena, plays the principal part in this decomposition. In the nasal cavities there is normally a rich bacterial flora, consisting, among other germs, of glycolytic bacteria, so called owing to their power to ferment sugar. The object of the recently introduced glucose treatment of ozena is to increase the activity of these microorganisms in the fermentation of carbohydrates, to the detriment of the Perez bacillus. Moreover, tryptic ferments require an alkaline medium to act on protein substances, whereas the fermentation of sugars is accompanied by the formation of acid, whereby the proteolytic activity of the Perez bacillus is inhibited and the organism itself destroyed. The treatment consists in first removing the crusts by irrigation with an alkaline solution or spray and then applying a solution of glucose or honey on swabs three or four times a day to all parts of the nasal cavity. In 22 cases so treated by Bruzzi in Italy very satisfactory results were obtained. In 10 patients glucose was used and in 12 honey, the results being equally good in both cases. The duration of the treatment ranged from 15 to 30 days.

As ozena is a condition which on board ship makes the patient especially obnoxious to his shipmates this simple treatment may be well worth a trial.

That workers engaged in certain branches of the pottery trade are seriously and constantly exposed to lead poisoning, chiefly from the lead contained in the glaze, and that this danger can be reduced, provided that certain facilities and methods are altered by the pottery

owners and certain precautions taken by the workers, sums up the findings of a report to the United States Public Health Service, made by Consulting Hygienist Bernard J. Newman, Dr. William J. McConnell, Dr. O. M. Spencer, and Statistician F. M. Phillips.

The investigation, which was begun early in 1919, had been requested by the Brotherhood of Operative Potters because they desired to disprove the contentions that their trade was extremely hazardous and that the workmen in certain occupations were likely to develop lead poisoning. These contentions were maintained by life insurance companies as grounds for discrimination in the granting of life insurance policies to certain groups of pottery workers. The investigators received cordial support from both the workers and the pottery managers.

Ninety-two potteries, situated in New Jersey, Ohio, Pennsylvania, and West Virginia, employing 21,000 persons, or 53 per cent of the total pottery workers in the United States, were investigated. Only the workers exposed to lead were examined, and of the total examined, 1,504 were males and 398 females. A very large majority of the workers employed in the pottery industry are native-born Americans.

The portal of entrance through which the larger part of the lead is received by the body was found to be the stomach, as the lead was inhaled as dust, retained in the nasal and pharyngeal cavities, and later swallowed with mucus, saliva, and food. The chewing of tobacco, eating food contaminated with lead dust, and carelessness in personal habits such as wiping the lips, mustache, etc., with glaze-covered fingers are contributory means toward the entrance of the lead into the human body.

A lesser, but still important portal of entry, is by the lungs, which absorb lead from fumes as well as dust. Absorption of lead through the skin is possible, but was found to be almost negligible in this case.

Risk of lead poisoning differs greatly in the many occupations of the pottery trade. The highest percentage of poisoning among men was found to be among the dippers and the next highest among the mixers and the odd-men. The highest percentage of poisoning among the women is among the dippers' helpers and the ware gatherers. These among both men and women, are specified occupations, brought into direct contact with the glaze.

The percentage of lead poisoning for these, as well as for other workers, drops as the percentage of lead used in the glaze decreases and lead poisoning of course may be expected to disappear when leadless glaze is used. The adoption and use of leadless glazes is not impossible, for they are used now satisfactorily by European potteries. Certain objections, however, which have prevented their

use in America, can at present be overcome only by radical changes in the manufacturing and firing methods. However, great improvement toward the decrease of lead poisoning can be brought about by the adoption of fritted lead glazes, as it would only be necessary to employ two or three men to prepare and frit the glaze against the present methods now employed, whereby large numbers come in contact with the lead glaze, either in its preparation or its use. Methods and formulas for making proper frits are given in the report.

The number of cases of poisoning found in the various occupations of the pottery trade does not alone establish their relative hazard, for this must be considered in the light of numerous modifying factors. The investigation, for instance, showed that the number of cases of lead poisoning increases with age of the workers, with their relative years of exposure, and with the length of the workday. It showed also that poisoning is more prevalent among the men than among the women, but this was shown to be due to the fact that the men had been exposed for about three times as many years as the women. It showed also that poisoning was more prevalent among workers who eat in the workroom or drink from vessels used in the workroom but not properly covered; and in plants where the toilet facilities, ventilation, and lighting are bad, and in those where the dust counts and percentage of lead in the dust are high. It is easy to see that any or all of these respective factors are likely to be influenced by the susceptibility of the individual or play a more or less important part in the production of lead poisoning as the personal habits and tendencies of the individual vary.

The relative weight to be given to these and other minor factors is very difficult to fix definitely, and the authors urge that no one should jump at the conclusion that to remedy any particular condition, other than remove the lead from the glaze, would immediately reduce the poisoning. The effect of each and all of them, however, deserves careful consideration.

The most important recommendations given to the workers who are really anxious to protect themselves follow: Always eat a good breakfast, drink milk, never eat or drink in the workroom, and never drink from uncovered containers kept in the workroom. Never wear street clothing and shoes in the workroom, never take work clothes home, and keep the work clothes and street clothes in separate sections of the locker. While at work do not chew tobacco or gum, do not spit on the floor, do not wear beards, do not stroke mustache with glaze-coated hands while at work, and do not put fingers, if covered with glaze, on lips or in mouth. Keep your hair covered in the workroom. When quitting work wash face and hands with hot water, clean finger nails, and rinse out mouth. Avoid

creating dust, insist that only wet sweeping and dusting be done, and avoid spilling glaze, as it will create lead dust.

Plant managers should supply: Bubbling fountains with palatable drinking water, adequate dressing rooms with two compartment lockers for each worker, decent and adequate toilet facilities, and adequate natural and artificial illumination and ventilation. They should discourage eating in the workroom and eating anywhere without previous washing of the hands and face, should encourage the use of overalls, should absolutely forbid dry sweeping and all sweeping of any type during work hours, and should prevent, so far as possible, the spilling of glaze and the consequent dust and dirt.

The first number of a new publication *The International Journal of Gastro-Enterology*, edited by G. L. Soresi, M. D., appeared July 1, 1921. It is the aim of the editor to publish original papers on problems relating to gastroenterology and allied branches of medicine and to render these papers more valuable by the commentaries of at least three men of high scientific standard in that specialty. This journal, being international in scope and aiming to promote scientific intercourse between members of the profession of all countries, will publish papers contributed in their original language, the first issue containing two such papers, an experiment in medical journalism which will be watched with interest.

An important feature of this journal is a section devoted to "Preliminary notes" and designed to protect and encourage original workers, and at the same time to prevent ideas that are not fully developed and found to be really valuable from entering into medical practice.

The first issue is beautifully illustrated and is printed on an India paper having a yellowish tint which is restful to the eyes. The UNITED STATES NAVAL MEDICAL BULLETIN welcomes it into the great family of medical periodicals.

A recent report by Lieut. Col. Dalrymple, of the Royal Army Medical Corps, concerning the treatment of malaria-infected troops in France, published in *Observations on Malaria by Medical Officers of the Army and Others*, War Office, London, 1919, shows how serious, from a military standpoint, this infection may become, and how proper treatment will result in the disappearance of the infection and the consequent restoration of the soldiers to duty.

Twenty-two battalions of infantry arrived in France from service in Saloniki, and a careful examination demonstrated that between

70 and 80 per cent of the men were infected with malaria. The daily sick call averaged from 30 to 60 cases of malaria in most of the regiments and had the troops been ordered at once to active field service not over 50 per cent of the men could have complied with the order.

Owing to the extent and severity of the malarial infection in these battalions they were placed in camps and every officer and man placed upon a routine quinine treatment. The treatment adopted was as follows:

Each officer and soldier received daily doses of quinine as follows: Fifteen grains of quinine, sulphate or hydrochloride, in solution, for 14 successive days, with the troops in parade formation, so that its administration could be supervised by the officers. Afterwards for a period of two months, 60 grains of the drug were given per week, at the rate of 10 grains every day for 6 days, Sunday excepted. The quinine parade of each regiment took place at a definite time daily. If relapses occurred the men were sent at once to hospital, where the routine treatment was as follows:

Quinine in solution in 10-grain doses given every 4 hours until 40 grains were given in the 24 hours; this dose was continued for 5 days. If the soldier remained fever free for two days afterwards he was placed upon the routine treatment outlined above; if not, the more intensive treatment was repeated.

The results of the treatment of these battalions were most gratifying. The average length of treatment before the men were ready for active duty was 10 weeks, and two divisions of the troops were put in the forward area within three months of commencement of treatment practically relapse free.

The above experience demonstrates that troops badly infected with malaria can be rid of the infection if quinine is given in the proper dosage and in the proper manner, i. e., under the direct supervision of officers at stated times, and that the use of the drug is not attended by injurious effects, even when continued for a long period of time. (Medico-Military Review, Medical Department, U. S. Army.)

There has recently been reported to the Surgeon General of the Army the case of a soldier, a patient in a station hospital, who was poisoned by being given 60 c. c. of formaldehyde solution by mistake for 60 c. c. of magnesium sulphate solution. This poison was administered by an enlisted man of the Medical Department, on duty in the ward, at the direction of the nurse in charge to give the patient a dose of magnesium sulphate.

Such an unfortunate event should bring forcibly to the attention of all medical officers and nurses the great importance of complying

with all the requirements of the Manual for the Medical Department relative to the safe-keeping of poisons and the administration of medicines.

That the shaking of alkalinized aqueous solutions of arsphenamine in the air for 60 or even 30 seconds greatly increases their toxicity, probably by oxidation, is stated by G. B. Roth as a result of experiments described by him in a recent report to the U. S. Public Health Service.

Some preparations, of neoarsphenamine particularly, may not be readily soluble, and such are liable to be shaken to hasten solution. The results from this are almost always highly toxic and should not be used clinically; although a relatively low-grade preparation may tolerate 5 or 10 seconds of shaking and yet pass the hygiene laboratory tests. Shaking in a closed bottle containing no air seems not to increase the toxicity.

The author concludes that the toxicity of the solutions is greatly influenced by the manner of their preparation, and that they should not be made in an open mortar or a large beaker. (Medico-Military Review, Medical Department, United States Army.)

The new buildings of the Peking Union Medical College, erected by the China Medical Board of the Rockefeller Foundation, were dedicated in September. The college, situated in the capital of the Chinese Republic, had its beginning in an earlier institution, the Union Medical College, founded in 1906 by the joint efforts of six British and American missionary societies. The property of the earlier school was transferred in 1916 to the China Medical Board of the Rockefeller Foundation, which purchased additional land and erected, in an interesting adaptation of classic Chinese architecture, a series of hospital and laboratory buildings. The institution comprises not only the medical school, but also a 250-bed hospital with outpatient clinics, a training school for nurses, and a premedical school—an institution of junior college grade with a distinct faculty and group of laboratory and classroom buildings.

A summary report by the Commission on Milk Standards for the nine years ending December 10, 1920, recently published by the United States Public Health Service, contains matters of much interest to health officers and to chemists and bacteriologists.

Standard whole milk, says the report, should contain not less than 8.5 per cent milk solids not fat and 3.25 per cent milk fat, standard

skim milk not less than 8.75 per cent of milk solids, standard cream not less than 18 per cent milk fat, and be free from all constituents foreign to normal milk.

The commission believes that it is necessary to permit standardized and adjusted milk; this despite the fact that it recognizes the ease with which milk is contaminated and the difficulty of so controlling standardizing, skimming, homogenizing, souring, etc., as to prevent contamination and the use of inferior materials. The manipulation of the milk, however, should be controlled; the product should be labeled "adjusted milk" (the label showing the minimum guaranteed per cent of fat); and the milk should comply with the sanitary and chemical requirements of unmodified milk.

To meet conditions in cities where milk contains less than 8.5 per cent solids not fat, milk sellers should be permitted to choose whether they will sell under the regular standard or under a guaranteed statement of composition. The sale of any normal milk should be permitted if its per cent of fat is stated. If this is not stated, the sale should be held to be unlawful unless the milk contains 3.25 per cent milk fat. Dealers selling under the guarantee plan should be required to state the guaranty conspicuously on all milk containers.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Lieutenant Commander C. W. O. BUNKER, Medical Corps, United States Navy.
Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.
Lieutenant Commander J. J. O'MALLEY, Medical Corps, United States Navy.
Lieutenant Commander J. HARPER, Medical Corps, United States Navy.
Lieutenant E. J. CUMMINGS, Medical Corps, United States Navy.
Lieutenant Commander H. E. HARVEY, Dental Corps, United States Navy.

SURGERY, ITS PRINCIPLES AND PRACTICE, by various authors, *Edited by W. W. Keen, M. D., LL. D., emeritus professor of the principles of surgery and of clinical surgery, Jefferson Medical College, Philadelphia.* Volumes VII and VIII. W. B. Saunders Co., Philadelphia, Pa., 1921.

These two volumes bring Keen's Surgery up to date. In them Dr. Keen, through his carefully chosen contributors, has gathered together a vast store of new knowledge of military, naval, and civil surgery.

Volume VII opens with short but illuminating chapters on inflammation; diseases caused by animals, insects, and reptiles; anthrax; surgery of the skin; and syphilis. The subject of gas gangrene is skillfully treated by Sir Cuthbert Wallace, of London, and is followed by an excellent chapter on tetanus by Dr. Fred T. Murphy, of St. Louis.

The following chapters deal with the organization and administration of the medical departments of the Army and Navy in war. These two chapters especially, and the following one on surgery in a fighting ship, should be read carefully by every naval medical officer, as they sum up our knowledge of military and naval practice.

There is a chapter on traumatic shock by Dr. W. B. Cannon, of Boston; one on the transfusion of blood and its substitutes by Dr. Burton J. Lee, of New York—an able review of the subject which deserves careful study.

Dr. John H. Gibbon, of Philadelphia, contributes a chapter on surgical technique which is based upon the experiences of the late war. Fractures, gunshot fractures, gunshot wounds, spinal injuries, peripheral nerve injuries, joint injuries, and their modern treatment are all competently handled. Discussions of orthopedic surgery, both civil and military, and of the military surgery of the vascular system, close the volume.

For the naval surgeon Volume VIII contains chapters on the surgery of the thyroid by Dr. C. H. Mayo; amputations, especially from the artificial-limb standpoint, by Dr. W. J. Taylor, of Philadelphia; operations on bones and joints by Dr. J. P. Warbasse, of New York; surgery of the head and war wounds of the face and jaws. There is an excellent chapter on dental surgery and the treatment of fractures of the jaw. Dr. Chevalier Jackson, of Philadelphia, contributes a chapter on direct laryngoscopy, bronchoscopy, and esophagoscopy, in which his special instruments are illustrated and described. One of the longest chapters in the volume is on the surgery of the thorax by Dr. G. J. Heuer, of Baltimore. Dr. G. W. Crile, of Cleveland, contributes his views on shock and anesthesia. Appendicitis and the surgery of the gall bladder, biliary ducts, and kidney are treated in chapters which are supplementary to chapters in previous volumes. There is a good chapter by Drs. R. M. Pearce and J. H. Austin on tests of renal functional efficiency in surgical conditions. The surgery of the bladder and ureters by Dr. Bransford Lewis, of St. Louis, and the surgery of the prostate by Dr. H. M. Young, of Baltimore, are exhaustively presented by the contributors. Dr. R. T. McKenzie, of Philadelphia, contributes a timely chapter on physiotherapy and mechanotherapy. Diagnostic immunologic reactions and specific therapy in surgical diseases are reviewed by Dr. J. A. Kolmer, of Philadelphia. Among the closing chapters of the volume is one by Colonel J. R. Church, Medical Corps, U. S. Army, on poison gas in war, in which the contributor skillfully reviews this subject.

The volume closes with a note by Dr. Keen himself on an effective method of dressing an artificial anus. (W. M. K. AND E. J. C.)

THE PRINCIPLES OF THERAPEUTICS, by *Oliver T. Osborne, M. A., M. D., professor of therapeutics, department of medicine, Yale University.* W. B. Saunders Co., Philadelphia, Pa., 1921.

This is an excellent work, very well written, and the subject matter is well arranged, with chapters on vaccines and serums, foods and diets, endocrine glands and organotherapy.

The author states that the work has been written with the view of presenting the data necessary for the student to well understand

the objects of scientific treatment, the rational use of active drugs, and the physical methods used in the treatment of diseases. The work is well indexed and is very thorough. (J. J. O'M.)

TREATISE ON FRACTURES IN GENERAL, INDUSTRIAL, AND MILITARY PRACTICE.
by *John B. Roberts, A. M., M. D., F. A. C. S., and James A. Kelly, A. M., M. D.* Second Edition. J. P. Lippincott Co., Philadelphia, Pa., 1921.

The reader of this book, whether engaged in private, industrial, or military surgery, will find that the text has been thoroughly revised, that particular attention has been given to differential diagnosis, and that many valuable illustrations have been included.

In the preface the author gives a brief outline explaining in a comprehensive way the methods of treatment to be used in the various types of fractures, showing the reader at the outset "the essence of the teaching which it is hoped this volume will impart."

The chapter on general considerations is excellent, discussing in complete, simple, and lucid detail the signs, symptoms, and complications of fractures from all angles. As the author says and exemplifies in his book, no one method is applicable to all fractures. He gives an instructive and helpful outline of the general rules applicable in the use of all forms of dressing for fractures. The book has a splendid illustration of an actually applied Buck's extension, a dressing that is so necessary in fractures of the lower extremities, but upon which not every book lays sufficient stress. He discusses and amplifies the three systems of treating fractures. (1) prolonged immobilization, (2) mobilization method of Lucas Championniere, (3) the traction method of Bardenhuer. The anatomical illustrations are excellent in showing the relation of fractured long bones to soft structures.

The closing chapter on industrial and war fractures contains valuable information gleaned from recent experience with fractures in their severer phases during the World War. The work is comprehensive, complete, direct in its explanation and instruction, a most valuable asset to any collection of books. (E. J. C.)

OPERATIVE SURGERY, by *John J. McGrath, M. D., F. A. C. S., professor of surgery, Fordham University.* Sixth Edition. F. A. Davis Co., Philadelphia, Pa., 1921.

This book is a worthy, carefully executed, and substantial treatise on the subject of operative surgery. The discussion of hemorrhage, with the methods of transfusion outlined, receives the proper amount of attention and a due place of importance early in this work. The chapter treating of operations on the head is splendidly written, concise, and gives a complete descriptive presentation of the various methods of approach in operations on the skull. The descriptive

anatomy throughout the book, with its bearing on operative surgery, is well handled, especially the surgical anatomy of the face prior to the discussion of operations on the face. The chapters on neck surgery and the discussion of operations on the stomach and intestines are excellent. The work throughout is concise, to the point, accurate in detail, up to date, and very well written.

The value of this treatise as a book for reference and instruction, can not be too highly recommended. (E. J. C.)

URINARY ANALYSIS AND DIAGNOSIS, by *L. K. Heitzmann, M. D.* Fourth Edition. William Wood & Co., New York, 1921.

The new (fourth) edition of this book takes but little cognizance of useful methods that have been developed during the six years that have elapsed since the appearance of the third edition, and the changes in the text are but few. Although in the first part, "only those tests are given, which can be used with advantage and without the necessity of a completely equipped chemical laboratory, by the general laboratory worker and the practitioner," the colorimetric methods for nitrogenous constituents involving Nesslerization and the use of permutit could well have been included. Nessler tubes can replace the colorimeter with sufficient accuracy for clinical purposes. Folin's micro-Kjeldahl method for total nitrogen is quite simple. Benzidine is not mentioned in connection with occult blood. With the many tests for acetone bodies, it would seem that the use of the Scott-Wilson reagent (distinctive for acetone) could have been given. Mosenthal's results with his nephritic test diet deserve space in a book of this caliber. "The greatest stress has been laid upon the microscopical examination and especially the microscopical diagnosis," but I believe the general opinion would still follow the author's own words, "the majority of textbooks on this subject still teach that diagnosis can not be made from a microscopical examination of urine, except in those cases in which casts are present." The text upon microscopical examination is, however, admirable and very useful. It is unfortunate that the illustrations are not more realistic. They are, to say the least, decidedly crude, and the few new ones are not much of an improvement over those replaced. (C. W. O. B.)

GYNECOLOGY, by *Brooke M. Anspach, M. D., associate in gynecology, University of Pennsylvania, with an introduction by John G. Clark, M. D.* J. B. Lippincott Co., Philadelphia, Pa., 1921.

This is a new textbook which has been sponsored by that eminent gynecologist, Dr. John G. Clark, and Dr. Anspach is to be congratulated in producing a book worthy of its sponsor. In the preface he states that "a logical plan for studying the pathology of any organ or group of organs and the method of treatment may be formulated

to include, (1) a description of the normal structure and of the normal function; (2) a review of the causes that produce the abnormal; and (3) a summary of the manifestations of the abnormal and of the methods of treatment." Believing this to be a rational sequence, the author has arranged and discussed the subject matter in the following order: (1) Normal anatomy and physiology; (2) morbid anatomy and physiologic abnormality that are dependent upon the developmental defects; (3) the acquired causes of disease of the reproductive organs; (4) the general symptomatology, both subjective and objective, of diseases peculiar to the pelvic organs, together with the approved methods of investigation; and finally (5) a systematic arrangement and description of the diseases affecting the organs and structures of the entire generative tract—their morbid anatomy, symptomatology, diagnosis, and treatment. In this way the author approaches and treats his subject in a methodical manner that gives to the work a natural sequence and proper line of thought, making it thorough, well constructed, and more easily comprehended and assimilated.

The book is well supplied with excellent and highly instructive illustrations. The illustrations depicting the gross pathological lesions about the external genitals are sufficient to give even the beginner in the study of gynecology an accurate idea of the actual pathological lesion in vivo. Descriptive pictures of operations are distinctly clear and readily understood, an important thing for a man who wants to learn and understand the delicate repair and constructive surgery demanded in this specialty.

The chapter on backache, a distressing and oftentimes prominent symptom found in women from various disorders, is vital and important to any physician and a fitting addition to any well-rounded-out work along these lines. The chapters set aside for the discussion of postoperative treatment, postoperative complications, and radium and roentgen-ray therapy are recommendations in themselves to show how thoroughly the author has completed his work. (E. J. C.)

THE PRINCIPLES OF IMMUNOLOGY, by *Howard T. Karsner*, M. D., professor of pathology, Western Reserve University, Cleveland, and *Enrique E. Ecker*, Ph. D., instructor in immunology, Western Reserve University, Cleveland. J. P. Lippincott Co., Philadelphia, Pa., 1921.

This book is a concise work on the fundamental principles of immunology presented in such a clear manner as to make the volume of especial value to students of medicine and to practitioners who are unable to consult the great mass of material which has been published regarding resistance and immunity.

The authors consider, in an adequate manner, the virulence of organisms, general conditions of infection and immunity, the gen-

eral phenomena of immunity, toxins and antitoxins, agglutinins and precipitins, cytolysins, cellular resistance, complement fixation and its application to the diagnosis of disease, hypersusceptibility, and the digestive ferments. A very desirable feature of the book is the appendix, in which the authors have collected and presented in a brief way data on the practical application of the therapeutic employment of blood serum, prophylactic vaccination, and vaccine therapy.

The subjects treated are handled in an excellent and up-to-date, if somewhat brief, manner. Facts are concisely stated, theories and hypotheses are treated fairly, and conclusions are soundly drawn.

There is room for doubt as to the authors' conclusions upon the teaching value of the diagrams usually employed in explaining Ehrlich's hypothesis.

It would seem to have been wise if more of the technique of immunology had been given. No method is given, for instance, for taking blood from laboratory animals without killing them. It is hardly worth the space it takes to describe the technique of making opsonic indexes. Few people do them nowadays, and it is questionable whether this so-called index really tells us anything.

It is a pity that more time was not given in the text to a consideration of immunity reactions in vaccination (cowpox), as the diagnostic advantages of these as to immunity or lack of it in smallpox is great.

On the whole, the book is most satisfactory in covering the subject. It is well printed and will prove most helpful not only to students and busy practitioners but to the profession in general. (J. H.)

THE ALLEN (STARVATION) TREATMENT OF DIABETES, by *Lewis Webb Hill, M. D.*, junior assistant visiting physician, *Children's Hospital, Boston*, and *Rena S. Eckman*, dietitian, *Massachusetts General Hospital, Boston, 1911-1916*, with an introduction by *Richard C. Cabot, M. D.* Fourth Edition. W. M. Leonard, Boston, Mass., 1921.

This is a little volume of 140 pages which should be in the library of every physician and in the hands of every diabetic patient. The book begins with a lucid presentation of the details of Dr. Allen's starvation treatment. This is followed by a series of illustrative case reports from the Massachusetts General Hospital and the Children's Hospital, Boston. Continuing, we note a short passage written for the diabetic patient, telling him in a few words something of his disease. As a convenience to the practitioner, the qualitative and quantitative tests for the examination of diabetic urine are included.

Most valuable of all are a graduated series of diet tables and a number of handy recipes for the preparation of diabetic foods. A chapter on food values and one on the protein and starch content of various proprietary "diabetic foods" completes the volume. (W. M. K.)

PRACTICAL PREVENTIVE MEDICINE, by *Mark F. Boyd, M. D., M. S., C. P. H., professor of bacteriology and preventive medicine, University of Texas; passed assistant surgeon (reserve), U. S. Public Health Service.* W. B. Saunders Co., Philadelphia, 1920.

This little volume of 352 pages represents, as its author states in the foreword, an endeavor to briefly present the salient features of modern preventive medicine. In a desire to cover the entire field a great condensation has been effected which, in many instances perhaps, results in an inadequate consideration of important subjects. It is believed the text contains the minimum amount of up-to-date knowledge of the subject, expressed in a pleasing manner and which a practitioner of medicine should be expected to possess.

The book is composed of seven sections, of which the first deals with diseases due to invading microorganisms and considers sources of infection, the dissemination of infective agents, contact transmission, diseases transmitted by contact, general measures of disease control, disinfectants and disinfection, excreta disposal, the relationship of water to health and disease, water purification, production and inspection of milk, milk as a route of infection, other foodstuffs as routes of infection, insects as vectors of infective agents, diseases transmissible by insects, lower animals as sources of infection for man, and other aspects of infectious disease. In section 2, the author considers deficiency diseases; in section 3, occupational hazards and diseases; in section 4, diseases arising from the puerperal state; in section 5, diseases transmitted from parent to offspring; in section 6, special aspects of hygiene and sanitation; and in section 7, demography. It contains numerous references to the public-health literature, especially that which exists in the publications of various departments of the United States Government, which are readily obtainable by the student of this subject, and the volume is amply and well illustrated.

It is regrettable that no mention of the use of calomel ointment in the medical prophylaxis of venereal disease is made in the text.

On the whole the work is a distinct addition to the literature of preventive medicine and is recommended as a manual for all interested in this important and growing branch of the medical science. (W. M. K.)

DIAGNOSTIC AND THERAPEUTIC TECHNIC, by *Albert S. Morrow, A. B., M. D., F. A. C. S., attending surgeon to the City Hospital and to St. Bartholomew's Hospital, New York.* Third edition. W. B. Saunders Co., Philadelphia, Pa., 1921.

In this volume, the author, who is the son of the late Dr. Prince A. Morrow, has brought together and arranged in a manner easily accessible for reference, a large number of procedures employed in the diagnosis and treatment of surgical diseases. The majority of the methods detailed in the book are the practical procedures which the general practitioner or the hospital interne may be called upon to perform at any time; yet much space has been devoted to methods of diagnosis and technique which are essentially in the domain of the specialist. Each procedure has been given in great detail. The work is up to date and conforms with the latest advances in methods of diagnosis and treatment. It is profusely illustrated, a special feature being a sketch of the collection of instruments required in the technique of each procedure.

The first portion of the book is devoted to a description of certain general diagnostic and therapeutic methods such as the administration of anesthetics, both general and local, sphygmomanometry, transfusion and the injection of human blood serum, venesection and its allied procedure, the administration of arsphenamine and neoarsphenamine, the treatment of neuralgia by injections, the disinfection of wounds by the Carrel-Dakin technique, Bier's hyperemia treatment, the production of an artificial pneumothorax, the diagnosis and treatment of fistulous tracts by means of bismuth paste, the collection and preservation of pathological material and exploratory punctures. The latter portion of the book deals with the methods of diagnostic and therapeutic technique which pertain to special regions and organs, such as the nose and accessory sinuses, the ear, the larynx and trachea, the esophagus, the stomach, the colon and rectum, the urethra and prostate, the bladder, the kidneys and ureters, and the female generative organs. Readers of this book will note that operative methods have been omitted as far as possible, only those being considered which are required in emergencies or which form a necessary part of some of the measures described.

So far as the reviewer is aware, there is no single volume which contains so much useful information concerning diagnostic and therapeutic technique. The book is so valuable to medical officers that its addition to the supply table of the Medical Department of the Navy for use on ships has been recommended. (w. m. k.)

ESSENTIALS OF TROPICAL MEDICINE, by *W. E. Masters, M. D. Bruz., M. R. C. S., L. R. C. P. Lond.* William Wood & Co., New York, 1920.

The author states in his preface that this work contains nothing new, and it is not intended as a substitute for any other work on

tropical medicine. It is claimed to be a digest of our knowledge of tropical medicine in a handy form for ready reference, the vade mecum of the student and busy tropical practitioner. If it had proved to be what its author claimed, it would have been welcome indeed. However, a careful perusal of this work reveals many gross errors and misstatements. The author has attempted to treat each subject fully in the systematic manner taught by the London School of Tropical Medicine, of which he is a graduate, and in so doing he has produced a volume which gives the impression of being a huge laboratory note book, full of the mistakes a student in class might make. The book shows hasty preparation and a lack of knowledge of the modern literature of many of the subjects treated. Apparently the author did not have access to the reports of investigations on gangosa by medical officers of the United States Navy, as his statements concerning the treatment of this disease are erroneous and misleading. (W. M. K.)

PRACTICE OF MEDICINE, by *Hughes Dayton, M. D.* Fourth Edition. Lea and Febiger, Philadelphia, Pa., 1921.

A handy, well-written, up-to-date epitome of practice for hasty reference by physicians or students of medicine. (W. M. K.)

TRAUMATIC SURGERY, by *John J. Moorhead, B. S., M. D., F. A. C. S., professor of surgery and director department of traumatic surgery, New York Post-Graduate Medical School and Hospital.* Second Edition. W. B. Saunders Co., Philadelphia. 1921.

The first edition of this book antedated the entry of the United States into the World War by a few weeks and was deficient in that it did not treat fully the newer methods of practice then being developed in Europe.

The second edition was prepared by Dr. Moorhead soon after he had returned from a very active service in France, and although he is not of the opinion that the management of the injured has been radically changed by war experience, he is convinced that the measures of military surgery applicable to civil life have been tried out sufficiently to justify the inclusion of some of them in this volume. We find in the new edition a complete discussion of the modern methods of treatment applicable to accident cases.

A large portion of the volume is devoted to a consideration of fractures, dislocations, and injuries of the joints. The volume is admirably illustrated, especially the section on special fractures in which the illustrations show clearly the special apparatus required for fixation, suspension, or traction. The book is recommended to all who are concerned in any way with accident surgery. (W. M. K.)

CANCER AND ITS NON-SURGICAL TREATMENT, by *L. Duncan Bulkley, A. M., M. D., senior physician to the New York Skin and Cancer Hospital.* Wm. Wood & Co., New York, N. Y., 1921.

This is a study of the cancer problem from every angle excepting that of operative surgery, with statistics and discussion of the failures of modern methods of treatment—operative, radium, and X-ray—compared with the improved results obtained by medical treatment. The author states that the mortality of cancer has risen 30 per cent during the past 20 years under surgical domination, and gives a review of cases treated medically from which the reader may be his own judge as to results.

The failures of surgery, radium, and X-ray are fully discussed. The author takes issue with our present-day views of the treatment of this condition and recommends a vegetable diet with hygienic adjustment of the functions of the body, and the proper use of such remedies as will incite the various organs of the body, including the endocrinous glands, "to form and eliminate properly the effete elements circulating in the system and effect the production of a healthy and proper blood stream." A diet list is given which consists of foods embraced in the 5, 10, and 20 per cent vegetables, with breads and other carbohydrates, all with a very low protein content.

The work is very lengthy, verbose, and hardly conclusive. (J. J. O'M.)

EPIDEMIC RESPIRATORY DISEASE, by *Eugene L. Opte, M. D., Colonel, M. R. C., U. S. Army; professor of pathology, Washington University School of Medicine.* *Francis G. Blake, M. D., Major, M. R. C., U. S. Army; associate member of the Rockefeller Institute for Medical Research.* *James C. Small, M. D., formerly First Lieutenant, M. C., U. S. Army; bacteriologist, Philadelphia General Hospital.* *Thomas M. Rivers, M. D., formerly First Lieutenant, M. C., U. S. Army; associate in bacteriology, Johns Hopkins University.* C. V. Mosby Co., St. Louis, 1921.

This very complete volume is an extensive study of influenza and pneumonia as seen in Camps Funston and Pike during the epidemic of 1918-19, the above authors having been appointed as a commission by the Surgeon General of the Army to study the pneumonias present in the above camps at that time. The medical magazines have presented volumes of literature during the past three years on the subject of influenza and its complications, and much of it had been very poorly studied and presented. The authors have made a very complete study of the conditions and present very positive conclusions from the bacteriological and pathological viewpoints. They state that "from all the evidence available it seems highly probable that B. influenza is the specific etiologic agent of epidemic influenza because it is always present in early uncomplicated cases of influenza; it is predominantly so during the acute stage of the disease in cases

going on to rapid recovery without development of complications; its rapidly increasing presence in normal individuals simultaneously with the progress of the epidemic indicates that actual dissemination of B. influenza readily occurs, and is very widespread during pandemic times; cultures of B. influenza are pathogenic for animals, and may produce in monkeys a disease closely resembling influenza."

The chapter on "Pathology and bacteriology," following influenza, is very well prepared and well illustrated with photographic plates of the different pathologic features of the disease. There is also a chapter on the pathology and bacteriology of the various types of pneumonia following measles. This is prepared on only 18 cases that came to autopsy, but is very complete.

The work goes a long way toward clearing up the confusion that has existed since the influenza pandemic, on the clinical diagnosis, with bacteriology and pathology of the pneumonias that followed, and is well worth careful reading. (J. J. O'M.)

HEART AFFECTIONS, THEIR RECOGNITION AND TREATMENT, by *S. Calvin Smith, M. S., M. D., instructor in medicine, University of Pennsylvania Graduate School of Medicine.* F. A. Davis Co., Philadelphia, Pa., 1920.

This is an excellent volume, very well arranged and sufficiently concise to give the reader all the necessary information for a good basic knowledge of affections of the heart. The author states that he "strives to encompass in small volume sufficient fundamentals of anatomy, physiology, pathology, diagnosis, and treatment to give the busy physician a working knowledge of the more recent advances in studies of the heart." This is an excellent aim in any author, and he has succeeded in presenting a book that is very readable and has all the meat of the subject.

The chapters on "Examination of the patient" are very complete and embrace the many points that lead to a correct diagnosis from inspection of the patient, palpation, percussion, auscultation, and interpretation of the presenting symptoms. The knowledge that graphic methods of examination, such as polygraph and electrocardiograph, give is discussed in a very lucid style, and the reader will find all that is necessary for a proper understanding of the tracings made from the different pathologic conditions of the heart.

The book is well illustrated, many illustrations being made from photographs of actual conditions existing in the heart and its valves, and adds to the attractiveness of the work. (J. J. O'M.)

MOUTH HYGIENE, by *Alfred C. Fones, D. D. S.* Second edition. Lea & Febiger, Philadelphia, 1921.

This is an admirable textbook for dental hygienists whose work is limited to the scaling and polishing of the teeth. Prevention being

the keynote of modern dentistry, the dental hygienist has been developed to fill a well-recognized need in the dental profession, and he is especially of value in preventing the development of pyorrhea and dental caries by a scientific method of scaling and polishing all the surfaces of the teeth. The list of contributors alone is sufficient to merit attention, as men well known to all in the profession have written chapters dealing with the normal and abnormal conditions found about the teeth.

The chapter on dental prophylaxis is of especial interest in giving the latest ideas on the system of instrumentation and is illustrated to show the four distinct motions, termed the digital, the wrist, the rotary or forearm, and the rigid arm motion. These are shown on models with the proper fulcrum indicated in each instance.
(H. E. H.)

INDEX TO UNITED STATES NAVAL MEDICAL BULLETIN.

VOLUME XV.

INDEX TO SUBJECTS.

[Articles not appearing in full in the BULLETIN are marked (ab).]

	Page.
Abdomen, trauma of (ab).....	655
Abdominal adhesions (ab).....	436
Abdominal rigidity, interpretation of.....	529
Absorption of calcium salts in man (ab).....	887
Accidental injuries from electric current.....	279
Accidental poisoning.....	627
Action of chloral on the pupil (ab).....	233
Acute aniline poisoning.....	123
Acute mastoiditis.....	106
Acute myelitis.....	130
Acute rheumatic fever.....	814
Adeno-carcinoma, a case of.....	552
Adhesive plaster.....	245
Administration of neosalvarsan.....	536
Advancement of ocular muscles by the Fox technique.....	392
Aestivo-autumnal malaria plasmodia (ab).....	886
Affections of tibial tubercle (ab).....	658
Agglutination of human erythrocytes by sera.....	86
Air and food passages, symptomatology and diagnosis of foreign bodies in (ab).....	893
Alexandria, Va., Medical Department of the United States Naval Torpedo Station.....	701
American Journal of Tropical Medicine.....	907
American Medical Congress, French view of.....	904
American Society of Tropical Medicine.....	668
Anesthesia, advances in (ab).....	431
Anesthesia in abdominal surgery (ab).....	433
Aniline poisoning, acute.....	123
Annual Report of the Surgeon General, U. S. Navy.....	243
Anophelines of California (ab).....	462
Antimony in the treatment of bilharzias (ab).....	227
Antivenereal campaign in Rouen.....	475
Anxiety and fear (ab).....	215
Application of Schick reaction to 2,911 naval recruits.....	485
Army and Navy, venereal statistics of, a study of certain published re- ports.....	179
Arsenic poisoning, treatment of (ab).....	639

	Page.
Arsphenamine solution, toxic effects of shaking.....	919
Arsphenamines in therapeutics (ab).....	415
Art and X ray.....	667
Arterial blood, gases in (ab).....	638
Arthritis, rôle of prostate and seminal vesicles in (ab).....	850
Aseptic technique for canal instruments.....	533
Asphyxiation in garages.....	912
Ausculation, buccal (ab).....	209
Autoplastics for baldness (ab).....	220
Baldness, autoplastics for (ab).....	220
Basal metabolism.....	668
Basal metabolism of normal women (ab).....	889
Bats, orientation of.....	472
Benvenuto Cellini.....	909
Beriberi and pellagra, blood in (ab).....	641
Bilharziasis, antimony in the treatment of (ab).....	227
Bilharziasis, sterilization of ova in (ab).....	226
Biochemical methods of analysis, substitution of turbidimetry for nephelometry in (ab).....	888
Bladder, tumors of the (ab).....	221
Blood in pellagra and beriberi (ab).....	641
Blood of normal infants, phosphoric acid in (ab).....	889
Blood transfusion (ab).....	217, 839
Boggs, Dr. Russel H.....	478
Bone tumors (ab).....	448
Book notices.....	251, 499, 711
British Navy, dental service in.....	912
British Navy, influenza epidemic in.....	907
British Army, tetanus in (ab).....	870
Bronchial irritation, post-operative (ab).....	440
Broncho-spirochætosis.....	469
Brushing the teeth.....	824
Buccal auscultation (ab).....	209
Burns, orthopedic treatment of (ab).....	439
Calcium salts in man, absorption of (ab).....	887
Calling a spade an implement of horticultural utility.....	377
Canal instruments, aseptic technique for.....	533
Cancer of bladder, radium therapy of (ab).....	445
Carcinoma of the testicle, case of.....	557
Cardiac irregularity.....	732
Care of surgical patients (ab).....	440
Carriers of Entamoeba dysenteriae among soldiers (ab).....	873
Case Records of the Massachusetts General Hospital.....	905
Cellini, Benvenuto.....	909
Centenary of von Helmholtz.....	655
Cessation of respiration 15 hours before death.....	241
Chancroidal infections.....	554
Charlotte Amalia, sewage system in.....	481
Chenopodium, poisoning by oil of, a case of.....	818
Chest, penetrating wounds of (ab).....	451
Chloral on the pupil, action of (ab).....	233
Cholecystectomy and pyelotomy, cases of.....	831

	Page.
Chloroform, ethylchloride, and ether for anesthesia, mixture of (ab).....	218
Chloropicrin to exterminate rats.....	242
Cholera, diagnosis of (ab).....	457
Circumcision.....	77
Civil surgery, war's contribution to (ab).....	454
Clinical chart, suggested.....	49
Clinical notes.....	387, 507, 809
Clinical recognition of syphilis (ab).....	202
Coffee and vitamins (ab).....	224
Colles's fracture.....	901
Colloidal gold solution, preparation of.....	94
Color blindness.....	717
Comparative values.....	634
Conference on war victims.....	244
Conjunctivitis, vernal, treated with radium.....	128
Consulting surgeon in the Near East, A.....	911
Contributing to the BULLETIN.....	629
Control, conscious extension of (ab).....	213
Cookies, laxative.....	246
Corneal disease of tubercular origin (ab).....	231
Counsels and Ideals from the Writings of William Osler.....	913
Court-martial prisoners, survey of.....	291
Creatinurea (ab).....	889
Criminal, the (ab).....	652
Cutaneous sporotrichosis, a case of.....	809
Cultivation of gonococcus (ab).....	885
Cyst, echinococcus, a case of.....	530
Danger of week-end camping in the Tropics.....	907
Dangers of blood transfusion (ab).....	218
Death from neoarsphenamine.....	401
Death of Anton Weichseibaum.....	477
Dementia praecox, brain lesions of (ab).....	653
Dental branch of the Hospital Corps.....	118
Dental conditions, suggestions for recording.....	807
Dental foci in the etiology of systemic diseases.....	109
Dental service in the British Navy.....	912
Dental X-ray film holder.....	807
Dentistry in South America.....	669
Desertions, Navy, study of 100.....	53
Detection of mosquito larvæ.....	386
Diabetes mellitus in the negro race (ab).....	843
Diagnosis and cause of glaucoma; treatment by myotics (ab).....	227
Diagnosis and treatment of pulmonary tuberculosis (ab).....	197
Diagnostic point in tuberculosis.....	666
Diet deficiency in Vincent's angina.....	540
Differential diagnosis in tropical fevers (ab).....	871
Diphtheria, immunization against (ab).....	208
Diphtherialike organisms, virulence of (ab).....	886
Diphtheria, Mare Island, Calif., in 1920.....	84
Diseases of the blood (ab).....	845
Dislocation of first cervical vertebra.....	400
Diverticula of the duodenum (ab).....	438

	Page.
Dried cabbage as an anti-scorbutic.....	471
Duodenal and gastric ulcers, diagnosis of (ab).....	657
Dye industry.....	476
Dysentery, carriers among soldiers (ab).....	873
Ear in modern warfare, injuries to (ab).....	892
Echinococcus cyst, a case of.....	530
Echinococcus fluid, reaction from (ab).....	468
Edema, starvation.....	470
Editorial.....	175, 377, 627, 801
Electric current, accidental injuries from.....	279
Elephantiasis of the scrotum.....	834
Empyema cases.....	99
Empyema, operation for (ab).....	453
Empyema, surgical treatment of, by a closed method (ab).....	361
Encephalitis lethargica (ab).....	467
Encephalitis lethargica and hiccough.....	671
Encephalitis lethargica, treatment of (ab).....	639
Endocrines and the teeth.....	472
End-to-end anastomosis (ab).....	443
Enlistments.....	235
Epidemic encephalitis, eye symptoms in (ab).....	644
Errata.....	655
Essential in nursing.....	246
Ether, chloroform and ethyl chloride for anesthesia, mixture of (ab).....	218
Ethyl chloride, chloroform, and ether for anesthesia, mixture of (ab).....	218
Etiology and prevention of injuries to the eye (ab).....	897
Etiology of scurvy (ab).....	853
Etiology of systemic diseases, dental foci in the.....	169
Excretion of quinine.....	243
Experienced officers, professional training of.....	237
Exploration of Mount Everest.....	670
Eye, ear, nose, and throat.....	892
Eyesight, preservation of.....	668
Eye symptoms in epidemic encephalitis (ab).....	644
Fabrics, fireproofing of.....	670
Failures, surgical.....	69
Fat-soluble vitamins (ab).....	839
Fear and anxiety (ab).....	215
Features of organization.....	40
Field hospital, Marine Corps.....	762
Fifth Congress of the International Society of Surgery, Paris.....	681
Finding malarial parasites.....	243
Fireproofing of fabrics.....	670
Fires, hospital (ab).....	223
First cervical vertebra, dislocation of.....	400
Fish as food in France, use of.....	671
Follow-up studies on mental patients (ab).....	654
Food-accessory factors in relation to the teeth (ab).....	854
Football squad, training and care of, U. S. Naval Academy, Annapolis, Md.....	770
Four centuries in the treatment of syphilis.....	749
Foreign bodies in the air and food passages, symptomatology and diagnosis of (ab).....	893

	Page
Formaldehyde poisoning	918
Fracture, Colles's	901
Fractured patella, treatment of (ab)	658
Fracture of vertebræ (ab)	450
Fractures of long bone, glue cast for	79
French view of an American Medical Congress	904
Future of medicine in the United States (ab)	649
Future of nursing	681
Garbage, municipal disposal of	906
Gases in arterial blood (ab)	688
Gas poisoning in warfare	775
Gastric and duodenal ulcers, diagnosis of (ab)	687
General file and record system	47
Genital tuberculosis (ab)	444
Genitourinary disease, radium and malignant (ab)	447
Glaucoma, diagnosis and cause of; treatment by myotics (ab)	227
Glue cast for fractures of long bones, A	79
Gold solution, colloidal, preparation of	94
Gonococcus, cultivation of (ab)	885
Grafting, skin (ab)	219
Hampton Roads, Va., summer school	495
Handling of recruits, marine barracks, Parris Island	740
Hand plastic	899
Helmholtz, von, centenary	655
Hemorrhoids, curing of	606
Hemorrhoids, diagnosis and treatment of (ab)	645
Herman-Perutz reaction	708
Hiccough and encephalitis lethargica	671
Hiccough, mechanism of (ab)	687
Historical	189, 347, 561, 787
History of Mare Island Hospital	10
Hospital Corps, dental branch of the	118
Hospital corpsmen, methods of instructing	302
Hospital fires (ab)	223
Hospital, Mare Island, history of	10
Hospital training of apprentices	296
Human erythrocytes by sera, agglutination of	86
Hygiene and sanitation	659
Hysteria in the Naval Service	515
Hysteria, theory of (ab)	424
Hysterical contracture	521
Icterus in malaria	248
Immediate surgery in fighting ships (ab)	855
Immediate surgery of war wounds as practiced in hospital ships (ab) ..	858
Immunization against diphtheria (ab)	208
Industrial code of New York	668
Infection of the mouth, Vincent's	542
Influenza epidemic in the British Navy	907
Influenzal pneumonia, intravenous use of magnesium sulphate	277
Influenza, treatment of	259
Information wanted	498
Injuries to the ear in modern warfare (ab)	802
Injuries to the eye, etiology and prevention of (ab)	897

	Page.
Instructing hospital corpsmen, methods of.....	302
Instruments, noncorrodible.....	532
International Journal of Gastro-Enterology.....	917
International Society of Surgery, Paris, Report of Fifth Congress of the.....	681
Interpretation of abdominal rigidity.....	529
Intravenous use of magnesium sulphate in influenzal pneumonia.....	277
Japan, physical development in.....	670
Keats, John, apothecary and poet.....	913
Keratitis, neuroparalytic.....	127
Key West, Fla., rat-proofing at the United States navy yard.....	673
Knee-joint injuries, Willems' treatment of (ab).....	866
Laboratory, Mare Island.....	34
Laboratory work in the Far East.....	669
Lachrymal sac, Mosher-Toti operation on (ab).....	898
Lateral sinus, thrombosis of.....	403
Lavage, Transduodenal (ab).....	207
Law regarding thermometers.....	245
Laxative cookies.....	246
Lead poisoning in the pottery trades.....	914
Lethargic encephalitis (ab).....	420, 422
Lethargic encephalitis, tuberculous meningitis simulating.....	387
Leather, preservation of.....	478
Libau, Lativa, Sanitary Report of.....	492
Life and times of Ambroise Paré.....	913
Lithiosis, prostatic.....	241
Liverpool School of Tropical Medicine (ab).....	873
Local anesthesia, sloughing in (ab).....	433
Lomas, Surgeon Captain, R. N.....	912
Machine-gun bullets or shell fragments, compound fractures due to.....	191
Magnesium sulphate in influenzal pneumonia, intravenous use of.....	277
Malarial fever, treatment of.....	917
Malaria, icterus in.....	243
Malarial parasites, finding.....	243
Malaria parasite, staining blood smears for (ab).....	458
Malaria plasmodia, aestivo-autumnal (ab).....	896
Malingering (ab).....	210
Manila Galleon, the.....	787
Mare Island, Calif., diphtheria in 1920.....	84
Mare Island Hospital, history of.....	10
Mare Island Laboratory.....	34
Mare Island Theater.....	50
Marine barracks, Parris Island, handling of recruits.....	740
Marine Corps field hospital.....	762
Massachusetts General Hospital, Case Records of.....	905
Massage, rules for.....	835
Mastoiditis, acute.....	106
Mechanism of hiccough (ab).....	637
Medical aspects of naval aviation (ab).....	851
Medical cases, transfusion in.....	117
Medical Corps of the Navy, pleasure and profit in.....	244
Medical Department of the United States Naval Torpedo Station, Alexandria, Va.....	701
Medical school of the University of Virginia.....	475

	Page.
Medical Sciences, progress in.....	197, 415, 637, 889
Medicine in the United States, future of (ab).....	649
Meningitis, a case of tuberculous.....	830
Meningitis, tuberculous.....	126
Mental and nervous diseases.....	652
Mental deficiency (ab).....	427
Mental patients, follow-up studies on (ab).....	654
Merchant ships, sanitary features of (ab).....	659
Mercurochrome.....	220
Mercurochrome in dentistry.....	194
Mercury bichloride, intravenously (ab.).....	206
Metabolism, basal.....	668
Middle ear, tuberculosis of (ab.).....	899
Milk standards.....	919
Miner's nystagmus.....	471
Mixtures of ethyl chloride, chloroform, and ether for anesthesia (ab.)....	218
Morale.....	175
Mosher-Toti operation on the lachrymal sac (ab).....	898
Mosquito larvæ, detection of.....	386
Mount Everest, exploration of.....	670
Municipal disposal of garbage.....	906
Muscles of the shoulder, plastic operation of.....	548
Mutual Aid Association, Navy.....	249
Myelitis, acute.....	130
Myotics, treatment by; cause and diagnosis of glaucoma (ab).....	227
National Academy of Science.....	476
National cancer week.....	905
Naval and military medicine, retrospect of.....	561
Naval aviation, medical aspects of (ab).....	851
Naval dispensary and hospital defined.....	477
Naval medical service as a career.....	477
Navy desertions, study of 100.....	53
Navy Mutual Aid Association.....	249
Necrosis of the mandible, two cases.....	134
Neosarsphenamine, death from.....	401
Neosalvarsan, administration of.....	536
Nephritis, test for (ab).....	640
Neuroparalytic, keratitis.....	127
New Orleans, La., surgical service of the United States Naval Hospital....	507
Nitric acid poisoning, death from.....	133
Noncorrodible instruments.....	532
Normal basal metabolism, standards for (ab).....	889
Notes and comments.....	235, 469, 655, 901
Notes, clinical.....	387, 507, 809
Novarsenobenzol, death from.....	193
Nursing, the essential in.....	246
Nystagmus, miner's.....	471
Observations on primary venereal sores (ab).....	867
Ocular symptoms in sinus disease (ab).....	643
Oil of chenopodium, poisoning by, a case of.....	818
Omission of "the".....	630
On learning to write.....	801
On several phases of syphilis.....	808

	Page.
Operating room technique.....	10
Operation for trichiasis.....	551
Operation for wrist drop.....	547
Operations for trauma of the urethra.....	407
Orchitis complicating tonsillitis.....	466
Organization, features of.....	40
Organization for a naval hospital, plans of.....	316
Orientation of bats.....	472
Orthopedic treatment of burns (ab).....	439
Oster, William, Counsels and Ideals from the Writings of.....	913
Osteoma of the tibia.....	181
Ozena, treatment of.....	914
Paré, Ambroise, life and times of.....	913
Parasites, malarial, finding.....	243
Patella, treatment of fractured (ab.).....	686
Patient himself (ab).....	213
Peking Union Medical College.....	476, 919
Pellagra and beriberi, blood in (ab).....	641
Pellagra in Haiti, report of.....	813
Pelvis, penetrating wound of the.....	544
Penetrating wound of the pelvis.....	544
Penetrating wound of chest (ab).....	451
Peptic ulcer.....	235
Perforating gastric and duodenal ulcer (ab).....	437
Pericarditis, tuberculosis.....	120
Persistence of pyloric and duodenal ulcers (ab).....	438
Pharmacopoeia of China.....	906
Phosphoric acid in the blood of normal infants (ab).....	869
Physical development in Japan.....	670
Picric acid.....	489
Pittsburgh, U. S. S., case of.....	239
Plague in Paris.....	475
Plans of organization for a naval hospital.....	316
Plaster, adhesive.....	245
Plastic operation on the muscles of the shoulder.....	548
Plastic war surgery in civil life (ab).....	453
Pleasure and profit in the Medical Corps of the Navy.....	244
Pneumonia, 28 cases of.....	825
Poisoning, acute aniline.....	123
Poisoning, arsenic, treatment of (ab).....	639
Poisoning by oil of chenopodium, a case of.....	816
Poisoning, by formaldehyde.....	913
Poisoning in warfare, gas.....	776
Poisoning, lead, in the pottery trades.....	914
Poisoning, nitric acid, death from.....	133
Port au Prince, smallpox in.....	606
Postgraduate study in the Japanese Navy.....	476
Postoperative bronchial irritation (ab).....	440
Postoperative thrombophlebitis (ab).....	657
Pottery trades, lead poisoning in.....	914
Preparation of colloidal gold solution.....	94
Preservation of eyesight.....	668
Preservation of leather.....	478

	Page.
Primary venereal sores, observations on (ab).....	867
Professional training of experienced officers.....	287
Progress in medical sciences.....	197, 415, 637, 839
Prophylaxis, venereal, among United States marines at Honolulu.....	783
Prostate and seminal vesicles in arthritis, rôle of (ab).....	850
Prostatic lithiasis	241
Pulmonary tuberculosis, diagnosis and treatment of (ab).....	197
Pyelotomy and cholecystectomy, a case of.....	881
Quinine, excretion of.....	243
Radium and malignant genitourinary disease (ab).....	447
Radium therapy of cancer of bladder (ab).....	445
Rats, chloropicrin to exterminate.....	242
Rat-proofing at the United States navy yard, Key West, Fla.....	673
Reaction from echinococcus fluid (ab).....	466
Record system and general file.....	47
Recruits, handling of, marine barracks, Parris Island.....	740
Rectal absorption of glucose (ab).....	419
Red cells, variation in size of (ab).....	460
Refraction cases, report of 75.....	95
Removal of an unusually large tumor.....	558
Removal of traumatic rupture of spleen.....	545
Reports	481, 673
Resection of the small intestine for war wound (ab).....	868
Respiration, cessation of, 15 hours before death.....	241
Resuscitation in death under anesthesia (ab).....	429
Retinoscopic lens holder.....	383
Retirement of Filippo Rho, surgeon general, Italian Navy.....	655
Retrospect of naval and military medicine.....	561
Rheumatic fever, acute.....	814
Rho, Filippo, surgeon general, Italian Navy, retirement of.....	655
Ring the hanging drop, a method of.....	92
Roentgenological service	30
Rôle of the prostate and seminal vesicles in arthritis (ab).....	850
Rubber dam tampon (ab).....	656
Rules for massage.....	835
"Saddle-nose" deformity, surgical treatment of.....	397
Samoa	246
Sanitary features of merchant ships (ab).....	659
Sanitary Report of Libau, Latvia.....	492
Saprophytism of venereal organisms (ab).....	459
Saving suppurating incisions (ab).....	435
Schick reaction to 2,911 naval recruits, application of.....	485
Schistosomiasis in the Yangtze Valley (ab).....	872
Scrotum, elephantiasis of the.....	834
Scurvy, etiology of (ab).....	853
Sea sickness	410
Semilunar cartilage, dislocated.....	132
Service items	671
Service publications	479
Sewage system in Charlotte Amalie.....	481
Shell fragments or machine-gun bullets, compound fractures due to.....	191
Ships, merchant, sanitary features of (ab).....	659
Singultus (ab)	848

	Page.
Sinus disease, ocular symptoms in (ab).....	643
Skin grafting (ab).....	219
Sloughing in local anesthesia (ab).....	433
Smallpox in Haiti.....	492, 695
• So-called diseases of the blood (ab).....	845
Soyer, Alexis, historical sketch of.....	139
Spleen, traumatic rupture, removal of.....	545
Staining blood smears for malaria parasite (ab).....	458
Standardizing treatment for venereal disease.....	308
Standards for normal basal metabolism (ab).....	889
Standards, milk.....	919
Starvation edema.....	470
Sterilization in dentistry, methods of.....	282
Sterilization of ova in bilharziasis (ab).....	226
Strong room for alcohol and narcotics.....	385
Student health at the University of Iowa.....	244
Study of certain published reports on venereal statistics of Army and Navy.....	179
Study of 100 Navy desertions.....	53
Substitution of turbidimetry for nephelometry in certain biochemical methods of analysis (ab).....	888
Sugar production.....	473
Suggested devices.....	383, 807
Suggestion for recording dental conditions.....	807
Summer school, Hampton Roads, Va.....	495
Suppurating wounds after abdominal section (ab).....	435
Surgeon Captain Lomas, R. N.....	912
Surgery.....	655
Surgery in the Middle Ages.....	347
Surgical failures.....	69
Surgical patients, care of (ab).....	440
Surgical service of the United States Naval Hospital, New Orleans, La.....	507
Surgical treatment of empyema by a closed method (ab).....	861
Surgical treatment of "saddle-nose" deformity.....	397
Survey of 50 court-martial prisoners.....	291
Symptomatology and diagnosis of foreign bodies in the air and food passages (ab).....	893
Syphilis, case of innocent.....	556
Syphilis, clinical recognition of (ab).....	202
Syphilis, four centuries in the treatment of.....	749
Syphilis in malarial subjects, diagnosis of (ab).....	845
Syphilitics, treating (ab).....	852
Systemic diseases, dental foci in the etiology of.....	109
Tampon, rubber dam (ab).....	656
Teeth, food accessory factors in relation to the.....	854
Teeth of the ancient Egyptians.....	473
Testicle, carcinoma of, case of.....	557
Tetanus in the British Army (ab).....	870
Theater, Mare Island.....	50
Theory of hysteria (ab).....	424
Thermometers, law regarding.....	245
Thrombophlebitis, postoperative (ab).....	657
Thrombosis of the lateral sinus.....	403

	Page.
Thymus, treatment of enlarged.....	474
Tibia and fibula, a compound fracture of.....	132
Tibial tubercle, affections of (ab).....	658
Tibia, osteoma of.....	131
"To ride the hobbyhorse with the boys".....	878
Toxic effects of shaking arsphenamine solution.....	919
Training and care of football squad, United States Naval Academy, Annapolis, Md.....	770
Transduodenal lavage (ab).....	207
Transfusion, blood (ab).....	217, 889
Transfusion, dangers of blood (ab).....	218
Transfusion in medical cases.....	117
Transfusions, reactions from repeated (ab).....	643
Trauma of abdomen (ab).....	655
Trauma of the urethra, operations for.....	407
Traumata due to falling.....	535
Traumatic rupture of spleen, removal.....	545
Treatment by myotics, cause and diagnosis of glaucoma (ab).....	227
Treatment of enlarged thymus.....	474
Treatment of malarial fever.....	917
Treatment of ozena.....	914
Treatment of syphilis, four centuries in.....	749
Treatment of the "West Indian chancroid".....	412
Treatment of trypanosomiasis (ab).....	870
Trichiasis, operation for.....	551
Tropical fevers, differential diagnosis of (ab).....	871
Tropical Medicine, American Journal of.....	907
Tropical Medicine, Liverpool School of (ab).....	878
Trypanosomiasis, treatment of (ab).....	870
Tubercle, affections of tibial (ab).....	658
Tuberculin in the early diagnosis of tuberculosis.....	81
Tuberculosis, diagnostic point in.....	666
Tuberculosis, genital (ab).....	444
Tuberculosis of the middle ear (ab).....	809
Tuberculosis, pulmonary, diagnosis and treatment of (ab).....	197
Tuberculosis, tuberculin in the early diagnosis of.....	81
Tuberculous meningitis.....	126, 830
Tuberculous pericarditis.....	120
Tuberculous meningitis simulating lethargic encephalitis.....	387
Tumor, removal of an unusually large.....	558
Tumors, bladder (ab).....	221
Typhus fever in Serbia (ab).....	455
Ulcer, peptic.....	285
University of Iowa, student health at the.....	244
Urological service, the.....	16
Use of fish as food in France.....	671
United States Naval Torpedo Station, Alexandria, Va., Medical Depart- ment of the.....	701
U. S. S. Pittsburgh, case of.....	239
Variation in size of red cells (ab).....	460
Venereal disease, cost of (ab).....	646
Venereal disease, standardizing treatment for.....	308
Venereal organisms, saprophytism of (ab).....	459

	Page
Venereal prophylaxis among United States marines at Honolulu.....	783
Venereal statistics of the Army and Navy, a study of certain published reports.....	179
Vernal conjunctivitis treated with radium.....	128
Vertebræ, fracture of (ab).....	450
Vincent's angina, diet deficiency in.....	540
Vincent's infection of the mouth.....	542
Virulence of diphtherialike organisms (ab).....	836
Vitamine, fat-soluble (ab).....	829
Vitamines and coffee (ab).....	234
War's contribution to civil surgery (ab).....	454
War victims, conference on.....	244
Weichselbaum, Anton, death of.....	477
West Indian chancroid, treatment of the.....	412
Willems' treatment of knee-joint injuries (ab).....	803
Women's Civic League, Malden, Mass., action of.....	478
Wrist drop, operation for.....	547
X ray and art.....	967
X-ray film holder, dental.....	807
X-ray procedure and technique.....	584

INDEX TO AUTHORS.

[Articles not appearing in full in the BULLETIN are marked (ab.).]

	Page.		Page.
Abrahamson, I. (ab.)	420, 422	Christopherson, J. B. (ab.)	226
Alberty, W. M.	814	Clark, G. F.	813
Allen, D. C.	47	Clifton, A. L.	191
Allmand, D. (ab.)	878	Cole, L. G. (ab.)	438
Amati, A. (ab.)	640	Coleman, H. R.	90, 79
Angwin, W. A.	316	Colledge, L. (ab.)	892
Auerbach, R. W.	548	Corbus, C. (ab.)	221
Bailey, P. (ab.)	427	Cercoran, W. J.	557
Bainbridge, W. S.	835	Cottle, G. F.	762
Baker, M. C.	49	Cowles, W. L.	407
Baker, R. H. (ab.)	450	Cragin, H. S.	551
Barney, J. D. (ab.)	444	Craig, C. F. (ab.)	896
Baxter, E. M. (ab.)	896	Crandall, R. P.	316
Bell, G. (ab.)	866	Cummins, S. L. (ab.)	870
Bellinger, J. E.	401	Dalton, F. J. A. (ab.)	858
Benjamin, J. D.	406	Danforth, W. C. (ab.)	221
Bensaude, R. (ab.)	645	Darnall, W. A.	194
Bloedorn, W. A.	387, 515	Davies, A. (ab.)	457
Bloodgood, J. C. (ab.)	448	De Brun, H. S. (ab.)	848
Bloor, W. R. (ab.)	889	Denis, W. (ab.)	888
Blunt, K. (ab.)	889	De Young, I. M. (ab.)	889
Boland, F. K. (ab.)	657	Di Mattei, P. (ab.)	224
Boland, M.	552	Dye, M. (ab.)	889
Bond, E. D. (ab.)	654	Eagleton, A. J. (ab.)	886
Boorstein, S. W. (ab.)	439	Ehreuclou, A. H.	53, 109, 120, 128, 296, 521
Borelli, L. (ab.)	209		
Bostick, J. B.	536	Eising, E. H. (ab.)	866
Bostron, C. H. (ab.)	203	Engman, M. F. (ab.)	203
Bourke, A. E.	94	Ernst, H. (ab.)	645
Bowcock, H. M. (ab.)	643	Estes, jr., W. L. (ab.)	657
Bowman, F. H.	545	Farenholt, A.	385
Boyd, J. S. K. (ab.)	453	Farr, C. E. (ab.)	437
Breene, L. W.	834	Faulder, T. J. (ab.)	893
Brodley, J. (ab.)	643	Findlay, G. M. (ab.)	641
Brown, C. J.	695	Fischer, W. E. (ab.)	429
Brown, L. (ab.)	197	Foot, E. M.	545
Brown, W. T.	279	Forster, H. W. (ab.)	223
Buell, M. V. (ab.)	889	Freeborn, S. B. (ab.)	462
Burk, S. B.	681	Funk, V. A. (ab.)	436
Camerer, C. B.	392, 897	Furness, W. H. (ab.)	217
Castle, C. H.	291	Gardner, F. P.	544
Chaplin, A. (ab.)	659	Garrison, P. E.	673
Chelnisse, L. (ab.)	639	Genzmer, G. V.	708

	Page.		Page.
Gibson, C. L. (ab.)	656	Kress, C. C.	701
Glenn, E. (ab.)	839	Lane, H. H.	596, 783
Goodall, J. B.	542	Lee, B. J. (ab.)	454
Goodman, H. (ab.)	852	Lee, W. E. (ab.)	217
Graham, Bessie C.	10	Leegaard, F. (ab.)	899
Graham, V. A. (ab.)	887	Leman, I. I. (ab.)	843
Graves, W. W. (ab.)	202	Levin, A. J. (ab.)	207
Gray, G. A.	34, 81, 84, 86, 133	Lewisohn, R. (ab.)	438
Grindon, J. (ab.)	202	Lichtenstein, P. M. (ab.)	652
Gross, E. G. (ab.)	889	Linde, F. G.	181, 132
Grove, L. W. (ab.)	433	Loveall, B. F.	109, 118, 134
Grow, E. J.	717	Lowman, K. E.	495
Guinan, E. R.	99	Lowsley, O. S. (ab.)	850
Gurd, A. E. (ab.)	653	MacAllister, C. J. (ab.)	646
Haber, R. (ab.)	427	Mankin, G. H.	775
Hammond, L. J. (ab.)	655	Marshall, C. H. (ab.)	870
Hansen, O. S. (ab.)	639	Mason, E. H. (ab.)	887
Hardy, W. F. (ab.)	205	Mason, V. R. (ab.)	451
Harrigan, A. H. (ab.)	489	McDonagh, J. E. R. (ab.)	227
Hart, T. C.	50	McDonald, W. M. (ab.)	871
Harvey, H. E.	282, 533, 807, 824	McGregor, A. N. (ab.)	453
Henry, C. E.	410	McGuigan, H. (ab.)	233
Hepler, A. B.	16	McKesson, E. I. (ab.)	431
Herms, W. B. (ab.)	462	McKillips, G. M. (ab.)	889
Heuer, G. J. (ab.)	451	Meador, C. N.	106, 127
Hogan, J. J.	277	Meakins, J. (ab.)	638
Holden, W. A. (ab.)	644	Means, J. H. (ab.)	889
Holman, E. (ab.)	448	Melhorn, K. C.	492
Horner, W. D.	95, 128	Michael, W. H.	412
Horwitz, A. E. (ab.)	204	Michel, L. L. (ab.)	852
Howe, P. R. (ab.)	854	Miller, E. B. (ab.)	231
Hoyt, R. E.	809	Morris, C. H.	540
Hyatt, E. G. (ab.)	231	Morson, C. (ab.)	447
Ivy, R. H. (ab.)	453	Mosher, H. P. (ab.)	898
Jackson, C. (ab.)	893	Mozingo, A. E. (ab.)	861
Jacobs, I. E.	524	Murray, D. H.	117
Jeffrey, J. R.	825	Neilson, J. L.	259
Jenkins, C. E. (ab.)	885	Neuberger, J. F. (ab.)	851
Johnson, J. P. (ab.)	845	Norburn, C. S.	285, 530
Johnson, Lucius W.	10, 69, 77, 899, 529	Norwood, B. F.	485, 818
Jones, E. L.	558	Osborne, O. T. (ab.)	845
Jones, J. W.	556	Owens, W. D.	308
Karlem, Marie	94	Parham, J. C.	896, 740
Kellogg, J. H. (ab.)	440	Passot, R. (ab.)	220
Kerr, W. M.	302, 787, 801	Patrick, H. T. (ab.)	213
Klett, R. E. (ab.)	888	Pearce, W. F.	554
Kober, P. A. (ab.)	888	Pember, J. F. (ab.)	219
Koebbe, E. E.	403	Pemberton, J. de J. (ab.)	218
Kofoid, C. A. (ab.)	873	Peterson, E.	481
Kolischer, G. (ab.)	445	Pettigrew, R. L.	481

	Page		Page.
Pontano, F. (ab.)	466	Smith, L. E.	130
Posey, W. C. (ab.)	227	Steenbock, H. (ab.)	889
Pratt, G. P. (ab.)	451	Stephens, E. A.	507
Price-Jones, C. (ab.)	460	Stephens, H. E. R. (ab.)	855
Prince, M. (ab.)	424	Stephens, R. (ab.)	658
Priston, J. L. (ab.)	872	Stokes, J. H. (ab.)	415
Quain, E. P. (ab.)	218	Strong, R. P. (ab.)	455
Quirk, T. C.	406	Sumner, J. B. (ab.)	887
Ravdin, I. S. (ab.)	839	Swezy, O. (ab.)	873
Reed, E. U.	732	Tallerman, K. H. (ab.)	419
Rettig, F. A. (ab.)	231	Taylor, J. S.	139,
Riddick, W. J.	507	175, 347, 377, 378, 383, 561, 627	
Riggs, C. E.	179	Taylor, S. P.	830
Roberts, D. (ab.)	438	Thomas, G. C.	532
Roberts, M. H.	770	Tilney, F. (ab.)	649
Robnett, A. H.	831	Torrance, R. A.	193
Roger, H. (ab.)	637	Trantas, A. (ab.)	467
Royster, H. A. (ab.)	435	Upp, E. O.	84
Ruben, J. A. (ab.)	433	Vedder, E. B. (ab.)	853
Sale, J. J.	126	Watkins, T. J. (ab.)	435
Sanders, A. A. (ab.)	872	White, E. C.	40
Sauer, W. E. (ab.)	205	White, W. A. (ab.)	210, 213
Schulmann, E. (ab.)	637	Willard, D. G.	92
Sell, M. T. (ab.)	889	Williams, F. E. (ab.)	215
Shaffer, L. W.	749	Wilson, W. H.	53
Shaw, T. B. (ab.)	867	Woodwell, M. N. (ab.)	889
Sidbury, J. B. (ab.)	208	Worster, C. B.	524
Silk, J. F. W. (ab.)	440	Würdemann, H. V. (ab.)	897
Smith, A. C.	492	Yohannan, J. I.	547
Smith, E. S. (ab.)	206	Zalesky, W. J.	279, 401
Smith, G. T.	400	Zur Linden, W.	834

